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Physical Training





THE HISTORY OF THE

REIGN OF

CHARLES THE FIRST

BY

JOHN BURNET

OF THE UNIVERSITY OF OXFORD

IN TWO VOLUMES

LONDON

1704

A

VINDICATION
OF
DIVINE PROVIDENCE;
DERIVED FROM A
PHILOSOPHIC AND MORAL SURVEY
OF
NATURE AND OF MAN.

BY
JAMES HENRY BERNARDIN
DE SAINT PIERRE.
AUTHOR OF THE STUDIES OF NATURE.

..... MISERIS SUCCURRERE DISCO.

TRANSLATED BY
HENRY HUNTER, D. D.
MINISTER OF THE SCOTS CHURCH, LONDON WALL.

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VINDICATION

OF

DIVINE PROVIDENCE.

STUDY NINTH.

OF SOME GENERAL LAWS OF NATURE.

AND, FIRST,

OF PHYSICAL LAWS.

WE shall divide these Laws into Laws *physical*, and Laws *moral*. We shall first examine, in the sequel of this Volume, some physical Laws common to all the Kingdoms of Nature; and, in the following Study, shall make the application of them to plants, in conformity to the Plan proposed in the commencement of this Work. We shall, afterwards, proceed to the consideration of *moral* Laws; and shall endeavour to unfold in these, as well as in the *physical* Laws, the means of diminishing the sum of human wretchedness.

I must make frequent appeals to the candor of my Readers. I am presuming to open a path hitherto unattempted. I dare not flatter myself with the belief, that my progress and success keep pace with the ardor of my imagination, and the anticipations of my heart. But the imperfect materials, which I have busied myself in col-

lecting, may, perhaps, one day, assist men of greater ability, and in a happier situation, in raising to Nature a temple more worthy of her. Recollect, my dear Reader, that all I promised you was the frontispiece and the ruins of it.

OF CONFORMITY.*

Though Conformity be a perception of our reason, I place it at the head of physical Laws, because it is the first feeling which we endeavour to gratify in examining natural objects. Nay, there is a connexion so intimate between the physical character of those objects, and the instinct of every being possessed of sensibility, that a colour, simply, is sufficient to rouse the passions of animals. A red object puts the bull into a rage, and suggests to most fowls and fishes the idea of prey. The objects of Nature display, in Man, a feeling of a higher order, independent of his wants; it is that of conformity. It is by means of the multiplied conformities of Nature that Man has formed his own reason; for *reason* means nothing else but the *relation*, or *conformity*, of things that exist. Thus, for example, if I examine a quadruped, the eyelids,

* I do not know any single word in our language which expresses closely the import of the French word *convenance*. It signifies *suitableness*, *correspondence*, the *exact* adaptation of one thing to another. I employ the term *conformity*, as coming the nearest to our Author's idea of any one that occurred to my mind. Whoever has attempted translation must, frequently, have felt the difficulty of rendering certain *words* by exactly equivalent *words*, though he was at no loss where general meaning and expression were concerned; for there is no perfect *convenance* between language and language. I wish it to be understood, then, that wherever the word *conformity* occurs, in the immediate sequel of this Translation, the meaning is, a complete coincidence, congruity, or tallying of object with object, as a bone fitted to its socket, as the undulations of a paper check to those of its counter check, as eye to eye, hand to hand, foot to foot; and it applies equally to natural and to moral objects.

which it can raise or let fall, at pleasure, present to me conformities with light ; when I look at the form of his feet, I see a conformity to the soil which he is designed to inhabit. It is impossible for me to conceive a determinate idea of these, without combining, on the subject, various feelings of conformity, or of the want of it. Nay, the most material objects, and such as have not, in strictness of speech, any decided form, cannot present themselves to us without those intellectual relations. A rustic grotto, or a steep rock, please or give pain, according as they present to us the ideas of repose or of obscurity, of perspective or of precipice.

Animals have a sensibility only of objects which have particular conformities to their wants. It may be affirmed that they have, in this respect, a share of reason as perfect as our own. Had *Newton* been a bee, he could not, with all his geometry, have constructed his cell in a hive, without giving it, as the honey bee has done, six equal partitions. But Man differs from animals, in his capacity of extending this sentiment of conformity to all the relations of Nature, however foreign they may be to his personal demands. It is this extension of reason which has procured for him, by way of eminence, the denomination of a rational animal.

It is unquestionably true, that if all the particular rationality of all animals were united, the sum would probably transcend the general reason of Man ; for human reason has devised most of its arts and crafts, entirely from an imitation of their productions ; besides, all animals come into the world with their peculiar industry, whereas Man is under the necessity of acquiring his, at the expense of much time and reflection ; and, as I have just observed, by imitating the industry and skill of another. But Man excels them, not only by uniting, in himself alone, the intelligence scattered over all the rest, but by his capability of rising upward to the source of all conformities, namely, to GOD himself. The only character,

which essentially distinguishes Man from the animal, is this, He is a religious Being.

No one animal partakes with him of this sublime faculty. It may be considered as the principle of human intelligence. By it Man is exalted above the instinct of the beasts, so as to be enabled to form a conception of the general plans of Nature; and which led him to suppose an order of things, from having caught a glimpse of an Author. By it he was emboldened to employ fire as the first of agents, to cross the Ocean, to give a new face to the Earth by agriculture, to subject all animals to his empire, to establish Society on the basis of a religion, and to attempt to raise himself up to DEITY by his virtues. It was not Nature, as is commonly believed, which first pointed out GOD to Man, but it is a sense of the DEITY, in Man, which has indicated to him the order of Nature. The Savages are religious, long before they are Naturalists.

Accordingly, by the sentiment of this universal conformity, Man is struck with all possible conformities, though they may be foreign to him. He takes an interest in the history of an insect; and if his attention is not engaged in behalf of all the insects which surround him, it is because he perceives not their relations, unless there be some *Reaumur* at hand to display them to him; or else, the constant habit of seeing them renders them insipid; perhaps it may be some odious or contemptible prejudice; for he is affected still more by moral than by physical ideas, and by his passions more than by his reason.

We shall farther remark, that all the sentiments of conformity spring up in the heart of Man, at the sight of some useful end, which, frequently, has no manner of relation to his own personal wants: It follows, that Man is naturally good, for this very reason, that he is rational; seeing the aspect alone of a conformity, though entirely foreign to him, communicates a sense of pleasure. It is from this natural sentiment of goodness, that the sight of

a well proportioned animal conveys to us agreeable sensations, which increase in proportion as the creature unfolds its instinct. We love to see a turtle, even in an aviary ; but that bird pleases still more, when at large in the forest, uttering the murmurs of love from the top of an elm, or when we perceive her busily constructing in it a nest for her young, with all the sollicitude of maternal tenderness.

Once more, it is from a result of this natural goodness that want of conformity communicates a painful sensation, which is always excited at sight of any thing incongruous. Thus we are shocked on looking at a monster. It gives us pain to see an animal wanting a foot or an eye. This feeling is independent of every idea of pain relatively to ourselves, let Philosophers say what they will ; for we suffer in such a case, though we are assured that the animal came into the world in that defective state. We are pained at the sight of incongruity, even in insensible objects. Withered plants, mutilated trees, an ill assorted edifice, hurt our feelings. These sensations are perverted, or suppressed, in Man, only by prejudice, or by education.

OF ORDER.

A series of conformities, which have a common centre, constitutes order. There are conformities in the members of an animal ; but order exists only in the body. Conformity refers to the detail, and order to the combination. Order extends our pleasure, by collecting a great number of conformities, and it fixes them, by giving them a determination toward one centre. It discovers to us at once, in a single object, a succession of particular conformities, and the leading conformity to which they all refer. Thus, order gives us pleasure, as beings endowed with a reason

which embraces all Nature ; and it pleases us still more perhaps, as being weak and limited creatures, capable of taking in only a single point at once.

It gives us pleasure, for example, to view the relations between the proboscis of a bee, and the nectareous juices of flowers ; between those of her thighs, hollowed into spoons, and bristled with hairs, to the fine powder of the stamina which she there collects ; between those of her four wings, to the booty with which she is loaded, (a resource by Nature denied to flies which travel without a burthen, and which, for this reason, are furnished with two only* ;) finally, the use of a long sting, which she has received for the defence of her property, and all the conformities of the organs of this small insect, which are more ingenious, and in much greater number, than those of the largest animals.

But the interest grows upon us, when we see her covered all over with a yellow powder, her thighs pendent, and half oppressed with her burden, directing her flight through the air, across plains, rivers and shady groves, under points of the wind, with which she is well acquainted, and alighting, with a humming sound, on the cavernous trunk of some aged oak. Here again we perceive a successive order, on seeing a great multitude of little individuals, similar to her, coming out, and going in, according as the business of the hive may require. That one, whose particular conformities we have been admiring, is only a single member of a numerous Republic ; and this Republic itself is but a small Colony, of the immense Nation of bees, spread over the whole Earth, from the Line up to the shores of the frozen Ocean.

This Nation, again, is subdivided into different species, conformably to the various species of flowers ; for

* The ichneumon, or aquatic dragon fly, is, in like manner, provided with four wings, because she too was intended to fly under a load. I have seen her catch butterflies in the air.

there are some which, being destined to live on flowers which have no depth, such as the radiated, are armed with five hooks, to prevent their sliding on the petals. Others, on the contrary, such as the bees of America, have no stings, because they construct their hives in the trunks of prickly trees, which are very common in that part of the world: Such trees, accordingly, are their protection. There are many other conformities, among the other species of bees, with which, we are totally unacquainted. Nevertheless, this vast Nation, so varied in its colonies, and whose possessions are so extensive, is but one little family of the class of flies, of which we know, in our own Climate alone, near six thousand species, most of them as distinct from each other, as to forms and instincts, as bees themselves are from other flies.

If we were to compare the relations of this volatile class, so numerous in itself, with all the parts of the vegetable and animal kingdoms, we should find an innumerable multitude of different orders of conformity; and were we to add to them, those which are presented to us in the legions of butterflies, scarabs, locusts, and other insects which likewise fly, we should multiply them to infinity. All this, still, would be but a small matter, compared to the various industry of the other insects which crawl, which leap, which swim, which climb, which walk, which are motionless; the number of these is incomparably greater than that of the first: And the history of these last, added to that of the others, would, after all, be the history of only one puny race of this great Republic of the World, replenished as it is with innumerable shoals of fishes, and endless legions of quadrupeds, amphibious animals, and birds.

All their classes, with their divisions, and subdivisions, the minutest individual of which presents a very extensive sphere of conformities, are themselves only particular conformities; only rays and points in the general

sphere, of which Man alone occupies the centre, and apprehends the immensity.

From a sense of the general order, two other sentiments obviously result; the one which throws us imperceptibly into the bosom of the DEITY, and the other, which recalls us to the perception of our wants; the one which exhibits to us, as the original cause, a Being infinitely intelligent, without us, and the other, as the ultimate end, a very limited being, in our own person. These two sentiments characterize the two powers of which Man is constituted, the spiritual and the corporeal. This is not the place to unfold these: It is sufficient for my purpose to remark, that these two natural sentiments are the general sources of the pleasure which we derive from the order of Nature. Animals are affected only by the second, and that in a very limited degree.

A bee has a sentiment of the order of her hive; but she knows nothing beyond that. She is totally ignorant of the order which regulates the ants in their nest, though she may have frequently seen them prosecuting their labours. To no purpose would she resort, in the event of her hive's being destroyed, to seek refuge, as a republican, in the midst of their Republic. To no purpose, in the hour of distress, would she attempt to avail herself of the qualities which she has in common with them, and which make communities to flourish, temperance, a disposition to industry, the love of Country, and, above all, that of equality, united to superiour talents: She would meet, from them, with no hospitality, no consideration, no compassion. Nay, she would not find an asylum even among other bees of a different species: For every species has its proper sphere assigned to it, and this by an effect of the wisdom of Nature; for if it were otherwise, the best organized species, or the strongest, would expel the others from their domains. Hence it follows, that the society of animals could not subsist independent of the passions, nor human society independent of virtue. Man a-

Stone, of all animals, possesses the sentiment of universal order, which is that of the DEITY himself; and by carrying over the whole Earth, the virtues which are the fruits of it, whatever may be the differences which prejudice interposes between man and man, it is sure of alluring all hearts to itself. It was by this sentiment of universal order which governed your life, that you have become the men of all Nations, and that you interest us still, even when you are no longer with us, *Aristides, Socrates, Marcus Aurelius*, divine *Fenelon*, and you, likewise, unfortunate *John James*!

HARMONY.

Nature opposes beings to each other, in order to produce between them agreeable conformities. This Law has been acknowledged from the highest Antiquity. It is to be found in many passages of the Holy Scriptures. I produce one from the Book of Ecclesiasticus :* *Omnia duplicia, unum contra unum, & non fecit quidquam deesse.* "All things are double, one against another; and He hath made nothing unperfect; One thing establissheth the good of another."

I consider this great truth as the key of all Philosophy. It has likewise been fruitful in discovery, as well as that other; *Nothing has been created in vain.* It has been the source of taste in the arts and in eloquence. Out of contraries arise the pleasures of vision, of hearing, of touching, of tasting, and all the attractions of beauty, of whatever kind it may be. But from contraries, likewise, arise ugliness, discord, and all the sensations which fill us with disgust. In this there is something very wonderful,

* Ecclesiasticus, chap. xlii, ver. 24, 25.

that Nature should employ the same causes to produce effects so different. When she opposes contraries to each other, painful affections are excited in us ; but when she blends them, we are agreeably affected. From the opposition of contraries springs discord, and from their union results harmony.

Let us endeavour to find in Nature some proofs of this great Law. Cold is the opposite of heat, light of darkness, earth of water ; and the harmony of these contrary elements produces effects the most delightful : But if cold succeeds rapidly to heat, or heat to cold, most vegetables and animals, exposed to such sudden revolutions, are in danger of perishing. The light of the Sun is agreeable ; but if a black cloud suddenly intercepts, or bears upon, the lustre of his rays, or if a gleaming flame, such as that of lightning, bursts from the bosom of a very dark night, the eye, in both these cases, undergoes a painful sensation. The horror of a thunder storm is greatly increased, if the tremendous explosions are interrupted by intervals of profound silence ; and it is heightened inexpressibly, if the oppositions, of those celestial fires and obscurities, of that tumult and tranquility, make themselves felt in the gloom and silence of night.

Nature opposes, in like manner, at sea, the white foam of the billows to the black colour of the rocks, in order to announce to the mariners from afar the danger of shallows. She frequently presents to them forms analagous to destruction, such as those of ferocious animals, of edifices in ruins, or of the keels of ships turned upward. She even extracts from these awful forms hollow noises resembling groans, and broken off by long intervals of silence. The Ancients believed that they saw in the rock of Scylla, a female of a hideous form, whose girdle was surrounded by a pack of dogs, which barked incessantly. Mariners have given to the rocks of the Bahama channel, so noted for shipwrecks, the name of the *Martyrs*, because they present, through the spray of the billows which break

on them, the horrid spectacle of men impaled, and exposed on wheels. You would even imagine, that you heard sighs and sobbings issuing from these dismal shallows.

Nature employs, in like manner, those clashing oppositions, and those ominous signs, to express the characters of savage and dangerous animals of all kinds. The lion strolling, by night, through the solitudes of Africa, announces his approach from a great distance, by roarings, which have a striking resemblance to the rolling of thunder. The vivid and instantaneous flashes of fire which dart from his eyes in the dark, exhibit, besides, the appearance of that formidable meteor, lightning. During the Winter season, the howlings of the wolves in the forests of the North resemble the whistling of the winds as they agitate the trees; the cries of birds of prey are shrill, piercing, and now and then interrupted by hollow notes. Nay, there are some which emit the sounds of a human being in pain. Such is the lom, a species of sea-fowl, which feeds on the shelvy coast of Lapland,* on the dead bodies of animals which are there put ashore: He cries like a man a drowning.

Noxious insects exhibit the same oppositions, and the same signals of destruction. The gnat, thirsting after human blood, announces himself to the eye, by the white points with which his brown coloured body is fludded, and to the ear, by his shrill notes, which disturb the tranquillity of the grove. The carnivorous wasp is speckled, like the tiger, with black stripes on a yellow ground. You frequently find in our gardens, about the roots of trees which are decaying, a species of bug, of a longish form, which bears on its red body marbled with black, the mask of a death's head. Finally, the insects which attack our persons more immediately, however small they may be, distinguish themselves by glaring oppositions of colour to the field on which they settle.

* See *John Scherffer's History of Lapland*.

But when two contraries come to be blended, of whatever kind, the combination produces pleasure, beauty and harmony. I call the instant, and the point, of their union, *Harmonic expression*. This is the only principle which I have been able to perceive in Nature; for the elements themselves, as we have seen, are not simple: They always present accords formed of two contraries to analyses multiplied without end. Thus, to resume some of the instances already adduced, the gentlest temperatures, and the most favourable, in general, to every species of vegetation, are those of the seasons in which cold is blended with heat, as in the Spring and Autumn. They are then productive of two saps in trees, which the strongest heats of Summer do not effect. The most agreeable production of light and darkness are perceptible at those seasons when they melt into each other, and form what Painters call the *clear obscure* and *half lights*. For this reason it is, that the most interesting hours of the day are those of morning and evening: Those hours, when, in the beautiful imagery of *La Fontaine*, in his charming fable of *Pyramus* and *Thisbe*, the shade and the light strive for the mastery in the azure fields. The most lovely prospects are those in which land and water are lost in each other; this suggested that observation of honest *Plutarch*; namely, that the pleasantest land journies are those which we make along the shore of the sea; and the most delightful voyages those which are a coasting along the land. You will observe these same harmonies result from flavours and sounds the most opposite, in the pleasures of the palate, and of the ear.

We shall proceed to examine the uniformity of this Law, in the very principles by which Nature gives us the first sensations of her works, which are colours, forms and motions.

Of Colours.

I shall be carefully on my guard not to give a definition of colours, and still more, not to attempt an explanation of their origin. Colours are, as Naturalists tell us, refractions of the light on bodies, as is demonstrated by the prism, which, by breaking a ray of the Sun, decomposes it into seven coloured rays, which display themselves in the following order ; red, orange, yellow, green, blue, indigo and violet. These are, as they will have it, the seven primitive colours. But, as has been already observed, We do not know what is primitive in Nature. I might object to them, that if the colours of objects are produced only from the refraction of the light of the Sun, they ought to disappear at the light of a taper, for the light of a taper is not decomposed by the prism : But I shall confine myself to a few reflexions respecting the number, and the order of those seven pretended primitive colours.

First, it is evident that four of these are compounded ; for orange is made up of yellow and red ; green, of yellow and blue ; violet, of blue and red ; and indigo is nothing more than a tint of blue furcharged with black. This reduces the solar colours to three primordial ; namely, yellow, red and blue ; to which if we add white, which is the colour of light, and black, which is the privation of it, we shall have five simple colours with which may be compounded all imaginable shades of colour.

I must here observe, that our philosophical machinery deceives us with its affectation of superior intelligence, not only because it ascribes false elements to Nature, as when the prism displays compound for primitive colours, but by stripping her of such as are true ; for how many white and black bodies must be reckoned colourless, con-

sidering that this same prism does not exhibit their tints in the decomposition of the solar ray!

This instrument leads us farther into an error respecting the natural order of these very colours, by making the red ray the first in the series, and the violet ray the last. The order of colours in the prism, therefore, is only a triangular decomposition of a ray of cylindrical light, the two extremes of which, red and violet, participate the one of the other, without terminating it; so that the principle of colours, which is the white ray and its progressive decomposition, is no longer manifested in it. I am very much disposed to believe, that it is even possible to cut a chrystal with such a number of angles, as would give to the refractions of the solar ray an order entirely different, and would multiply the pretended primitive colours far beyond the number of seven. The authority of such a polyedron would become altogether as respectable as that of the prism, if the Algebraists were to apply to it a few calculations, somewhat obscure, with a seasoning of the ratiocination of the corpuscular philosophy, as they have done with regard to the effects of the triangular instrument.

We shall employ a method, not quite so learned, to convey an idea of the generation of colours, and of the decomposition of the solar ray. Instead of examining them in a prism of glass, we shall consider them in the Heavens, and there we shall behold the five primordial colours unfold themselves in the order which we have indicated.

In a fine summer's night, when the sky is serene, and loaded only with some light vapours, sufficient to stop, and to refract, the rays of the Sun, as they traverse the extremities of our Atmosphere, walk out into an open plain, where the first fires of *Aurora* may be perceptible. You will first observe the Horizon whiten at the spot where she is to make her appearance; and this kind of radiance, from its colour, has procured for it, in the

French language, the name of *aube* (the dawn) from the Latin word *alba*, which signifies white. This whiteness insensibly ascends in the Heavens, and assumes a tint of yellow, some degrees above the Horizon; the yellow, as it rises some degrees higher, passes into orange; and this shade of orange rises upward into the lively vermilion, which extends as far as the Zenith. From that point you will perceive in the Heavens, behind you, the violet succeeding the vermilion, then the azure, after it the deep blue or indigo colour, and last of all, the black quite to the westward.

Though this display of colours presents an infinite multitude of intermediate shades, which succeed each other with considerable rapidity, nevertheless, there is a moment, and, if my recollection of it be accurate, it is the moment when the Sun is just going to exhibit his disk, that the dazzling white is visible in the Horizon, the pure yellow, at an elevation of fortyfive degrees; the fire colour, in the Zenith; the pure blue, fortyfive degrees under it, toward the West; and, in the very West, the dark veil of night still lingering on the Horizon. At least, I think, I have remarked this progression between the Tropics, where there is scarcely any horizontal refraction to make the light prematurely incroach on the darkness, as in our Climates.

J. J. Rousseau observed to me one day, that though the field of those celestial colours be blue, the yellow tints which melt away into it, do not produce by that mixture the colour of green, as is the case in our material colours, when these two shades are blended. But, I replied, that I had frequently perceived green in the Heavens, not only between the Tropics, but over the Horizon of Paris. That colour, in truth, is hardly ever seen with us, but in some fine Summer evenings. I have likewise seen, in the clouds of the Tropics, all the colours perceptible on the earth, particularly at sea, and in stormy weather. You may then see some of them copper coloured, some

of the colour of the smoke of a tobacco pipe, some brown, reddish, black, grey, chefnut, livid, the colour of a heated oven's mouth. As to those which appear there in fine weather, some are so lively and brilliant, that no palace can exhibit any thing to vie with them, were it enriched with all the gems of the Great Mogul.

Sometimes the trade winds, from the Northeast, or Southeast, which constantly blow there, card the clouds through each other, like so many tufts of silk; then sweep them away to the West, crossing and recrossing them over one another, like the osiers interwoven in a transparent basket. They throw over the sides of this chequered work, the clouds which are not employed in the texture, and which are in no small number, roll them up into enormous masses, as white as snow, draw them out along their extremities in form of a crupper, and pile them upon each other, like the Cordeliers, of Peru, moulding them into the shape of mountains, of caverns, and of rocks; afterwards, as evening approaches, they grow somewhat calm, as if afraid of deranging their own workmanship. When the Sun comes to set behind this magnificent netting, you see a multitude of luminous rays transmitted through each particular interstice, which produce such an effect, that the two sides of the lozenge illuminated by them, have the appearance of being begirt with a fillet of gold, and the other two, which are in the shade, seem tinged with a superb ruddy orange. Four or five divergent streams of light, emanated from the setting Sun up to the Zenith, clothe with fringes of gold, the undeterminate summits of this celestial barrier, and proceed to strike with the reflexes of their fires the pyramids of the collateral aërial mountains, which then appear to consist of silver and vermillion. At this moment of the evening are perceptible, amidst their redoubled ridges, a multitude of valleys extending into infinity, and distinguishing themselves at their opening by some shade of flesh, or of rose colour.

Those celestial valleys present, in their different contours, inimitable tints of white, melting away into white, or shades lengthening themselves out, without mixing over other shades. You see, here and there, issuing from the cavernous sides of those mountains, tides of light precipitating themselves in ingots of gold and silver, over rocks of coral. Here it is a gloomy rock, pierced through and through, disclosing, beyond the aperture, the pure azure of the firmament; there it is an extensive strand, covered with sands of gold, stretching over the rich ground of Heaven; poppy coloured, scarlet, and green as the emerald.

The reverberation of those western colours diffuses itself over the Sea, whose azure billows it glazes with saffron and purple. The mariners, leaning over the gunwale of the ship, admire in silence those ærial landscapes. Sometimes this sublime spectacle presents itself to them at the hour of prayer, and seems to invite them to lift up their hearts with their voices to the Heavens. It changes its appearance every instant: What was just now luminous becomes in a moment coloured, simply; and what is now coloured will, by and by, be in the shade. The forms are as variable as the shades; they are, by turns, islands, hamlets, hills clothed with the palm tree; vast bridges stretching over rivers, fields of gold, of amethysts, of rubies, or rather, nothing of all this; they are celestial colours and forms which no pencil can pretend to imitate, and which no language can describe.

It is very remarkable, that all travellers who have, at various seasons, ascended to the summits of the highest mountains on the Globe, between the Tropics, and beyond them, in the heart of the Continent, or in Islands, never could perceive, in the clouds below them, any thing but a gray and lead coloured surface, without any variation whatever as to colour, being always similar to that of a lake. The Sun, notwithstanding, illuminated those clouds with his whole light; and his rays might there

combine, without obstruction, all the laws of refraction to which our systems of Physics have subjected them. From this observation it follows, and I shall repeat it in another place, because of its importance, that there is not a single shade of colour employed in vain, through the whole extent of the Universe; that those celestial decorations were made for the level of the Earth, and that their magnificent point of view is taken from the habitation of Man.

These admirable concerts of lights and forms, which manifest themselves only in the lower region of the clouds, the least illuminated by the Sun, are produced by laws with which I am totally unacquainted. But let their variety be what it may, the whole are reducible to five colours; yellow appears to be a generation from white; red a deeper shade of yellow; blue, a tint of red greatly strengthened; and black, the extreme tint of blue. It is impossible to entertain a doubt respecting this progression, if you observe, in the morning, as I have mentioned, the expansion of light in the Heavens. You there see those five colours, with their intermediate shades, generating each other nearly in this order: White, sulphur yellow, lemon yellow, yolk of egg yellow, orange, Aurora colour, poppy red, full red, carmine red, purple, violet, azure, indigo, and black. Each of those colours seems to be only a strong tint of that which precedes it, and a faint tint of that which follows; thus the whole together appear to be only modulations of a progression, of which white is the first term, and black the last.

In this order, whereof the two extremes, white and black, that is, light and darkness, produce, in harmonizing, so many different colours, you will remark, that the red colour holds the middle place, and that it is the most beautiful of the whole, in the judgment of all Nations. The Russians, when they would describe a beautiful girl, say she is red. They call her *crasna dévitsa*: Red and beautiful being with them synonymous terms. In Mexi-

co and Peru, red was held in very high estimation. The most magnificent present which the Emperor *Montezuma* could devise for *Cortez*, was a necklace of lobsters, which naturally had that rich colour.* The only demand made upon the Spaniards by the King of Sumatra, on their first landing in his country, and presenting him with many samples of the commerce and industry of Europe, was some corals, and scarlet coloured stuffs;† and he promised to give them, in return, all the spices, and other merchandise, of India, for which they might have occasion.

There is no such thing as carrying on trade, to any advantage, with the Negroes, the Tartars, the Americans, and the East Indians, but through the medium of red cloths. The testimonies of travellers are unanimous respecting the preference universally given to this colour. Of this I could produce proofs innumerable, were I not afraid of being tedious. I have indicated the universality of this taste, merely in the view of demonstrating the fallhood of the philosophic axiom which asserts, that tastes are arbitrary, or which amounts to the same thing, that there are in Nature no laws for beauty, and that our tastes are the effects of prejudice. The direct contrary of this is the truth; it is prejudice that corrupts our natural tastes, which would otherwise be the same over the whole Earth. From a prejudice of this kind, the Turks prefer green to every other colour, because, according to the tradition of their Theologians, this was the favourite colour of *Mahomet*, and his descendents alone, of all the Turks, have the privilege of wearing the green turban.

But from a similar, though opposite prejudice, the Persians, their neighbours, despise green, because they reject the traditions of those Turkish Theologians, and, accordingly, do not acknowledge that consanguinity of their Prophet, being followers of *Ali*.

* See Herrera.

† See General History of Voyages by the Abbe Prevost.

From another chimera, yellow appears to the Chinese the most distinguished of all colours, because it is that of their emblematical dragon. Yellow is, in China, the imperial colour, as green is in Turkey. The Chinese, nevertheless, if we may depend on the authority of *Isbrants Ides*, represent their Gods and Heroes, on the stage, with their faces stained a blood colour.* All these Nations, the political colour excepted, consider red as the most beautiful, which is sufficient to establish with respect to it, an unanimity of preference.

But, without dwelling longer on the variable testimony of Man, we have only to appeal to that of Nature. It is with red that Nature heightens the most brilliant parts of the most beautiful flowers. She has given a complete clothing of it to the rose, the Queen of the Garden : She has bestowed this tint on the blood, which is the principle of life in animals : She invests most of the feathered race, in India, with a plumage of this colour, especially in the season of love. There are very few birds, on which she does not then bestow some shades, at least, of this rich hue. Some have their heads covered with it, such as those which are called Cardinals ; others have a breast plate of it, a necklace, a capuchin, a shoulder knot. There are some which preserve entirely the gray, or brown ground of their plumage, but glazed over with red, as if they had been rolled in carmine. Others are besprinkled with red, as if you had blown a scarlet powder over them. Together with this some have a mixture of small white points, which produces a charming effect. A little bird of India, called *Bengali*, is painted in this manner.

But nothing can be more lovely than a turtledove of Africa, who bears on her pearl gray plumage, precisely over the place of the heart, a bloody spot consisting of different kinds of red blended, perfectly resembling a

* Journey from Moscow, to China, page 141.

wound : It seems as if this bird, dedicated to Love, was destined to wear her master's livery, and had served as a mark to his arrows. What is still more wonderful, these rich coralline tints disappear in most of those birds as soon as the season of love is over, as if they were robes of ceremony, lent them by the benevolence of Nature, only during the celebration of their nuptials.

The red colour, situated in the midst of the five primordial colours, is the harmonic expression of them, by way of excellence ; and the result, as has been said, of the union of two contraries, light and darkness. There are, besides, tints extremely agreeable, compounded of the oppositions of extremes. For example, of the second and fourth colour, that is, of yellow and blue, is formed green, which constitutes a very beautiful harmony, and which ought, perhaps, to possess the second rank in beauty, among colours, as it possesses the second in their generation. Nay, green appears, in the eyes of many persons, if not the most beautiful tint, at least the most lovely, because it is less dazzling than red, and more congenial to the eye.*

* It is harmony which renders every thing perceptible, just as monotony makes every thing disappear. Not only are colours the harmonic consonances of light : But there is no one coloured body whose tint Nature does not heighten by the contrast of the two extreme generative colours, which are white and black. Every body detaches itself by means of light and shade, the first of which is akin to the white, and the second to the black. Every body, accordingly, bears upon it a complete harmony.

This is not the effect of chance. Were we enlightened, for example, by a luminous air, we should not perceive the form of bodies ; for their outlines, their profiles, and their cavities, would be overspread with an uniform light, which would cause their prominent and retreating parts to disappear. With a providence, therefore, completely adapted to the weakness of our vision, the AUTHOR of Nature has made the light to issue from a single point of Heaven : And with an intelligence that equally challenges our admiration, He has given a motion of progression to the Sun, who is the source of that light, in order to form, with the shades, harmonies varying every instant. He has likewise modified that light, on terrestrial objects, in such a manner, as to illuminate both immediately and mediately, by re-

I shall insist no longer on the other harmonic shades which may be deduced, in conformity to the laws of their generation, from colours the most opposite; and of which might be formed accords and concerts, such as Father *Castel* produced from his celebrated Harpsichord. I must, however, remark, that colours may have a powerful influence on the passions; and that they, as well as their harmonies, may be referred to the moral affections. For example, making red the point of departure, which is the harmonic colour supereminently, and proceeding toward white in an ascending progression, the nearer you approach to this first term, the more lively and gay are the colours. You will have in succession the poppy, the orange, the yellow, the lemon, the sulphur, the white. On the contrary, the farther you proceed from red toward black, the sadder and more lugubrious are the colours; for this is the progression; purple, violet, blue, indigo and black.

In the harmonies which may be formed, on both sides, by the union of opposite colours, the more that the tints of the ascending progression predominate, the more lively

fraction and by reflection, and to extend its tints, and its harmonies, with those of shade, in a way that no words can express.

J. J. Rousseau one day made this observation: "Painters can give the appearance of a body in relief, to a smooth surface; I should be very glad to see them give the appearance of a smooth surface to a raised body." I made no reply at the moment; but having since reflected on the solution of this problem in optics, I by no means consider the thing as impossible. The whole that is necessary, according to my idea, is to destroy one of the harmonic extremes which render bodies prominent. For instance, if the object aimed at were to flatten a bas-relief, it would be necessary to paint the cavities white, or the prominent parts black. Accordingly, as they employ the harmony of the clear obscure, to give the appearance of a solid body to a plane surface, they might employ the monotony of one single tint, to make what is actually raised and solid to disappear, and become to the eye a plane surface. In the first case, painting renders that visible which is not tangible; in the second, we should have a body that might be touched, without being visible. This last deception would be fully as surprising as the other.

will be the harmonies produced ; and the contrary will take place, in proportion as the colours of the descending harmony shall prevail. From this harmonic effect it is, that green, being compounded of yellow and blue, is so much more gay, as the yellow has the ascendant, and sad in proportion as the blue predominates.

Farther, from this harmonic influence it is, that white transfuses most gaiety into all other tints, because it is light itself. Nay, it produces, from opposition, a most delightful effect in the harmonies, which I call melancholy ; for, blended with violet, it gives the delicious hue of the lilach flower ; mixed with blue, it makes azure ; and with black, produces pearl gray ; but melted away into red, it exhibits the rose colour, that enchanting tint, which is the flower of life. On the other hand, according to the predominance of black in colours which are gay, the effect produced is more mournful than would have resulted from unmixed black. This becomes perceptible on blending it with yellow, orange and red, which are thereby rendered dull and gloomy colours. Red gives life to every tint into which it is infused, as white communicates gaiety, and black sadness.

If you would wish to produce effects entirely opposite to most of those which I have been just indicating, you have only to place the extreme colours closely by each other, without mingling them. Black, opposed to white, produces the most mournful, and the harshest effect. Their opposition is a badge of mourning among most Nations, as it is the signal of impending destruction in the tempestuous appearances of the Heavens, and in the commotions of the Ocean. The yellow too, opposed to black, is the characteristic of many dangerous animals, as the wasp, the tyger, and several others.....I do not pretend to insinuate, that the women have not the skill of employing to advantage, in their drefs, those opposite colours ; but they are called in as an embellishment only on account of the contrasts which they form with the colour of their

complexion ; and as the red predominates there, it follows that the opposite colours are advantageous to them, for harmonic expression is never stronger, than when found between the two extremes which produce it. We shall offer a few thoughts hereafter on this part of harmony, when we come to speak of contrasts, and of the human figure.

It would be ridiculous to affect ignorance of the objections which may be started against the universality of these principles. We have represented white as a gay, and black as a sad colour. Nevertheless, certain Negro Nations represent the Devil as white : The inhabitants of the Peninsula of India, in token of mourning, rub their forehead and temples with the powder of sandalwood, the colour of which is a yellowish white. The Navigator *La Barbinois*, who, in his voyage round the world, has as well described the manners of China, as those of our sea-officers, and of several European Colonies, says, that white is the colour of mourning among the Chinese. From these instances it might be concluded, that the feeling of colour must be arbitrary, as it is not the same in all Nations.

I venture to offer the following reply to these objections. It has already been proved by evidence, that the Nations of Africa and Asia, however black they may be, prefer white women to those of every other tint. If there be any Negro Nations who paint the Devil white, this may be easily accounted for, from the strong feeling which they have of the tyranny which the whites exercise over them. White, accordingly, having become with them a political colour, ceases to be a natural one. Besides, the white in which they paint their Devil is not a white, beautifully harmonious, like that of the human figure : But a dead white, a chalk white, such as that with which our painters illuminate the figures of phantoms and ghosts in their magical and infernal scenes.

If this dazzling colour is the expression of mourning among the Indians and Chinese, the reason is, it contrasts harshly with the black skin of those Nations. The Indians are black. The skin of the southern Chinese is much sun burnt. They derive their religion and their leading customs from India, the cradle of the Human Race, the inhabitants of which are black. Their outward garments are of a gloomy colour: A great part of their dress consists of black satin; the covering for their under extremities is black boots; the ornamental furniture of their houses consists, in a great measure, of that beautiful black varnished ware, which we import from their country. White must, therefore, produce a harsh dissonance with their furniture, their dress, and, above all, with the dusky colour of their skin.

If those Nations were to wear a black habit, in mourning, as we do, be their colour ever so deep, it would not form a clashing opposition in their dress. The expression of grief, accordingly, is precisely the same with them as with us. For if we, in a season of mourning, oppose the black colour of our clothes to the white colour of our skin, in order thence to produce a funeral dissonance, the southern Nations oppose, on the contrary, the white colour of their garments to the dusky colour of their skin, in order to produce the same effect.

This variety of taste admirably confirms the universality of the principles which we have laid down respecting the causes of harmony and dissonance. It farther demonstrates, that the agreeableness, or disagreeableness of a colour, resides not in one single shade, but in the harmony, or in the clashing contrast, of two opposite colours.

We might find proofs of those laws multiplied without end, in Nature, to which Man ought ever to have recourse in all his doubts. She opposes harshly, in hot countries as in cold, the colours of dangerous and destructive animals. Venomous reptiles are universally painted in gloomy colours. Birds of prey are universally of an earthy hue

opposed to yellow, and white specks on a dark ground, or dark spots on a light ground. Nature has given a yellow robe, striped with dusky brown, and sparkling eyes, to the tyger lying in ambush under the shade of the forests of the South: And she has tinged with black the snout and paws, and with blood colour the throat and eyes, of the white bear, and thereby renders him apparent, notwithstanding the whiteness of his fur, amidst the snows of the North.

Of Forms.

Let us now proceed to the generation of forms. If I am not mistaken, the principles of these, like those of colours, are reducible to five, namely, the line, the triangle, the circle, the ellipse and the parabola.

The line generates all forms, as the ray of light does all colours. It goes on progressively, like the other, in its generations, step by step, producing first, by three fractions, the triangle, which, of all figures, contains the smallest of surfaces under the greatest of circuits. The triangle afterward, composed itself of three triangles at the centre, produces the square, which consists of four triangles from the central point; the pentagon, which consists of five; the hexagon, which consists of six; and so of the rest of the polygons, up to the circle, which is composed of a multitude of triangles, whose summits are at its centre, and the bases at its circumference: And which, contrary to the triangle, contains the greatest of surfaces under the smallest of peripheries. The form which has, hitherto, always been going on progressively, commencing with the line, relatively to a centre, up to the circle, afterwards deviates from it; and produces the ellipse, then the parabola, and finally all the other widened curves, the equations of which may all be referred to this last.

So that under this aspect, the indefinite line has no common centre : The triangle has three points in its bounding lines, which have a common centre ; the square has four ; the pentagon five ; the hexagon six : And the circle has all the points of its circumference regulated conformably to one common and only centre. The ellipse begins to deviate from this regulation, and has two centres ; and the parabola, as well as the other curves, which are analogous to it, have centres innumerable contained in their several axes, from which they remove farther and farther, forming something like funnels.

On the supposition of this ascending generation of forms, from the line, through the triangle, up to the circle ; and their descending generation, from the circle, through the ellipse, to the parabola, I deduce, from these five elementary forms, all the forms of Nature ; as, with the five primordial colours I compose all the possible shades of colour.

The line presents the slenderest form, the circle presents the fullest, and the parabola the most obliquely fluted. In this progression it may be remarked, that the circle, which occupies the middle between these two extremes, is the most beautiful of all the elementary forms, as red is the most beautiful of all the primordial colours. I presume not to say, with certain ancient Philosophers, that this form must be the most beautiful, because it is the figure of the Stars, which, however, would be no such contemptible reason ; but, to employ only the testimony of our senses, it is the most grateful to both the eye and the touch ; it is, likewise, the most susceptible of motion ; finally, what is no mean authority in the case of natural truths, it is considered as the most conformable to the taste of all Nations, who employ it in their ornaments, and in their architecture ; and it is particularly conformable to the taste of children, who give it the preference to every other, in the instruments of their amusement,

It is very remarkable, that these five elementary forms have the same analogies to each other which the five primordial colours have among themselves ; so that if you proceed to their ascending generation, from the sphere toward the line, you will have forms angular, lively and gay, which shall terminate in the straight line, and of which Nature composes so many radiations and expansions of figure, in the Heavens and on the Earth, so agreeable to behold. If, on the contrary, you descend from the sphere to the excavations of the parabola, you will be presented with a gradation of cavernous forms, which are so frightful in abysses and precipices.

Farther, if you join the elementary forms to the primordial colours, term for term, you will observe their principal character mutually strengthen each other, at least in the two extremes, and in the harmonic expression of the centre : For the two first terms will give the white ray, which is the ray of light itself ; the circular form, united to the red colour, will produce a figure analogous to the rose, composed of spherical portions, with carmine tints, and, from the effect of this double harmony, deemed, in the judgment of all Nations, the most beautiful of flowers. Finally, black, added to the vacuity of the parabola, increases the gloom of retreating and cavernous forms.

With these five elementary forms may be composed figures as agreeable as the shades which are produced from the harmonies of the five primordial colours. So that the more there shall enter, into those mixed figures, of the two ascending terms of the progression, the more light and gay such figures will be ; and the more that the two descending terms shall predominate, the more heavy and dull will be the forms. Thus, the form will be so much the more elegant, as the first term, which is the straight line, shall have the predominance. For example, the column gives us pleasure, because it is a long cylinder, which has the circle for its basis, and two straight

lines, or a quadrilateral figure of considerable length, for its elevation. But the palm tree, of which it is an imitation, pleases still more, because the stellated and radiating forms of its palms, likewise taken from the straight line, constitute a very agreeable opposition with the roundness of its stem; and if, to this, you unite the harmonic form by way of excellence, namely, the circular, you will add inexpressibly to the grace of this beautiful tree. This, likewise, Nature, who knows much more of the matter than we, has taken care to do, by suspending, at the basis of its divergent boughs, sometimes the oval date, and sometimes the rounded cocoa nut.

In general, as often as you employ the circular form, you will greatly enhance the agreeableness of it, by uniting it with the two contraries of which it is composed; for, you will then have a complete elementary progression. The circular form alone presents but one expression, the most beautiful of all, in truth; but united to its two extremes, it forms, if I may so express myself, an entire thought. It is from the effect which thence results, that the vulgar consider the form of the heart to be so beautiful, as to compare to it every other beautiful and interesting object. That is beautiful as a heart, say they.* This heart form consists, at its basis, of a projecting angle, and above, of a retreating angle; there we have the extremes: And in its collateral parts, of two spherical portions: there is the harmonic expression.

It is, farther, from these same harmonies, that long ridges of mountains, overtopped by lofty peaks of a pyramidal form, separated from each other by deep valleys, delight us by their gracefulness and majesty. If to these

* Is not our Author here indulging fancy, rather than following Nature? If this be an idea and expression of the common people, it must be the commonalty of a particular country. *Heart* is, perhaps, universally used to express fondness, affection, desire; but to represent the *form* of that organ as *beautiful*, nay, the *essence* of beauty, is, surely, a violent stretch of imagination.

you add rivers meandering below, radiating poplars waving on their banks, flocks of cattle and shepherds, you will have vales similar to that of Tempe. The circular forms of the mountains, in such a landscape, are placed between their extremes, namely, the prominency of the rocks, and the cavity of the valleys. But if you separate from it the harmonic expressions, that is, the circular wavings of those mountains, together with their peaceful inhabitants, and allow the extremes only to remain, you will then have the dreary prospect of Cape Horn; angular, perpendicular rocks, hanging over fathomless abysses.

If to these you add oppositions of colour, as that of snow on the summits of the dusky rocks, the foam of the billows breaking on the lurid shore, a pale sun in a gloomy sky, torrents of rain in the midst of Summer, tremendous squalls of wind succeeded by sullen calms, a European vessel, on her way to spread desolation over the islands of the South Sea,* running upon a rock when it is beginning to grow dark, firing, from time to time, guns, the signal of distress, the noise of which the echoes of those horrid deserts reverberate, the terrified Patagonian running in amazement to his cave; you will have a complete view of that land of desolation, covered over with the shades of death.

* Would not the effect of this dreadful picture have been considerably strengthened, had our Author represented his European vessel as attempting to double Cape Horn, *on her return* from spreading devastation over the South Seas, and making shipwreck on that dreary coast, *after* the scene of blood was acted? In this case we should have had the striking and instructive representation of the connexion between Human Guilt and Divine Justice; of the clashing collision of criminality and vengeance. H. H.

Of Movements.

It remains that I suggest a few reflections on the subject of motions. Of these we shall, in like manner distinguish five which are fundamental : Self motion, or the rotation of a body round itself, which supposes no change of place, and which is the principle of all motion ; such is, perhaps, that of the Sun ; after that, the perpendicular, the circular, the horizontal and the state of rest. All movements whatever may be referred to these five. Nay, you will remark that Geometricians, who represent them likewise by figures, suppose the circular motion to be generated of the perpendicular and the horizontal, and, to make use of their language, produced by the diagonal of their squares.

I shall not insist on the analogies of the generation of colours and forms, to those of the generation of movements ; and which actually exist, between the white colour, the straight line, and selfmotion, or rotation ; between the red colour, the spherical form, and circular motion ; between darkness, vacuity, and rest. I shall not pretend to unfold the infinite combinations which might result from the union, or opposition, of the corresponding terms of each generation, and of the filiations of these same terms. I leave to the Reader the pleasure of following up this idea, and of forming to himself, with these elements of Nature, harmonies the most enchanting, with the additional charm of novelty. I shall confine myself, at present, to a few hasty observations respecting motion.

Of all movements, the harmonic, or circular motion, is the most agreeable. Nature has diffused it over most of her works, and has rendered even the vegetables, which are fastened down to the earth, susceptible of it. Our

plains present frequent images of this, when the winds form, on the meadow, or on the cornfield, a series of undulations, resembling the waves of the sea; or when they gently agitate, on the sides of the lofty mountains, the towering tops of the trees, waving them about in segments of a circle. Most birds form portions of great circles as they play through the airy expanse, and seem to take pleasure in tracing, as they fly, an infinite variety of curves and spiral motions. It is remarkable that Nature has bestowed this agreeable style of flying on many of the inoffensive species of the feathered race, not otherwise to be prized for the exquisiteness of either their song or their plumage. Such, among others, is the flight of the swallow.

The case is very different with respect to the progressive movements of ferocious or noxious animals. They advance leaping, springing, and join to movements sometimes extremely slow, others violently rapid: This is observable in the motion of the cat lying in wait to catch a mouse. Those of the tiger are exactly similar, in his approaches upon his prey. The same discordancy is observable in the flight of carnivorous birds. The species of owl called the grand duke, floats through the midst of a tranquil sky, as if the wind carried him this way and that. Tempests present, in the Heavens, the same characters of destruction. You sometimes perceive the stormy clouds moving in opposite directions, and with various degrees of velocity; now they fly with the rapidity of lightning, while others remain immoveable as the rock. In the tremendous hurricanes of the West Indies, the explosion is always preceded and followed by a dead calm.

The more that a body possesses of self motion, or of rotation, the more agreeable it appears, especially when to this movement is united the harmonic, or circular motion. It is for this reason, that trees whose leaves are moveable, such as the aspin and poplar, have more grace than other forest trees, when agitated by the wind. They

please the eye by the balancing of their tops, and by presenting, in turns, the two surfaces of their foliage, which display two different greens. They are likewise agreeable to the ear, from their imitation of the bubbling of water. From the effect of self motion, it is, that, every moral idea out of the question, animals interest us more than vegetables, because they have the principle of motion within themselves.

I do not believe there is a single spot on the Earth in which there is not some body in motion. Frequently have I been in the midst of vast solitudes, by day and by night, and in seasons of perfect tranquillity, and I have always heard some noise or another. Often, in truth, it was only the sound of a bird flying, or of an insect stirring a leaf ; but sound always supposes motion.

Motion is the expression of life. In this you see the reason why Nature has multiplied the causes of it in all her works. One of the great charms of a landscape is to see objects in motion ; and this is the very thing which the pictures of most of our great Masters frequently fail to express. If you except such of them as represent tempests, you will find, every where else, their forests and their meadows motionless, and the water of their lakes congealed. Nevertheless, the inversion of the leaves of trees presenting a gray or white under side ; the undulations of the grass in the valleys, and on the ridges of the mountains ; those which ruffle the smooth surface of the waters, and the foam which whitens the shores, recal, with inexpressible pleasure, in a burning summer scene, the breath so gentle and so cooling of the zephyrs. To these might be added, with infinite grace, and with powerful effect, the movements peculiar to the animals which inhabit them : For example, the concentric circles which the diving bird forms on the surface of the water ; the flight of a sea fowl taking its departure from a hillock, with neck advancing, and legs thrown backward ; that of two white turtles skimming side by side, in the shade, along the skirts

of a forest ; the balancing of a wagtail on the extremity of the foliage of a rush, bending under his weight. It might be possible even to represent the motion and the weight of a loaded carriage toiling up a hill, by expressing the dust of the crushed pebbles which rises up behind its wheels. Nay, I will go so far as to say, that I think the effects of the singing of birds, and of the echoes, might be rendered perceptible, by the expression of certain characters which it is not necessary here to unfold.

So far are most of our Painters, even among those whose talents are most conspicuous, from paying attention to accessories so agreeable, that they omit them in subjects of which those accessories form the principal character. For example, if they represent a chariot at full speed, they take pains to exhibit every spoke of the wheels. The horses, indeed, are galloping, but the chariot is immoveable. The wheels of a carriage, however, that is running with a rapid motion, present but one single surface ; all their spokes are confounded to the eye. It was not thus that the Ancients, our masters in every branch of Art, imitated Nature. *Pliny* tells us, that *Apelles* had so exactly painted chariots with four horses, that the wheels appeared to be turning round. In the curious list which he has transmitted to us of the most celebrated pictures of antiquity, and still viewed with admiration at Rome in his time, he particularly mentions one which represented women spinning wool, whose spindles seemed actually to whirl. Another was held in high estimation,* “ in which were represented two light armed soldiers, the “ one of whom is so heated with running in battle, that “ you see him sweat, and the other, who is laying down “ his arms, appears so exhausted, that you imagine you “ hear him panting.” I have seen, in many modern pictures, machines in motion, wrestlers and warriors in action, but in no one of them did I ever find attention

* *Pliny's Natural History.* Book xxxvii. chap. 10 and 11.

paid to these effects so simple, and so expressive of the truth of Nature. Our painters consider them as petty details, beneath the notice of a man of genius. Nevertheless these petty details are traits of character.

Marcus Aurelius, who possessed fully as much genius as any modern whatever, has very judiciously observed, that, in many cases, it is on such minutenesses the attention fixes, and from the contemplation of these the mind derives the most pleasure. “The sight of the shrivelling
“of ripe figs,” says he, “the bushy eyebrows of a lion,
“the foaming of an enraged wild boar, the reddish scales
“which rise on the crust of bread coming out of the oven, give pleasure.” This pleasure may be accounted for in various ways: First, from the weakness of the human mind, which, in contemplating any object whatever, fixes on some one principal point; and then, from the design of Nature, who, likewise, in all her works, presents to us one single point of conformity, or of discordancy, which is, as it were, its centre. The mind increases its affection, or its aversion, for this characteristic trait, the more simple that it is, and, in appearance, contemptible. This is the reason that, in eloquence, the shortest expressions always convey the strongest passions; for all that is requisite, as we have hitherto seen, in order to excite a sensation of pleasure, or of pain, is to determine a point of harmony, or of discord, between two contraries: Now, when these two contraries are opposites in nature, and are so, besides, in magnitude and in weakness, their opposition redoubles, and consequently their effect.

The effect is farther heightened, if to this is joined, especially, the surprise of seeing striking occasions of hope, or of fear, produced by objects of apparently small importance; for every physical effect produces, in Man, a moral feeling. For example, I have seen many pictures, and read many descriptions, of battles, which attempted to inspire horror, by representing an infinite variety of instruments of destruction, and a multitude of dying and

dead persons, wounded in every possible manner. The less did I feel myself moved, the more I perceived the machinery employed to move me: One effect destroyed the other. But I have been greatly affected by reading, in *Plutarch*, the death of *Cleopatra*.

That great Painter of calamity represents the Queen of Egypt meditating, in the tomb of *Anthony*, on the means of eluding the triumph of *Augustus*. A peasant brings her, with permission of the guards on duty at the entrance of the tomb, a basket of figs. The moment that the clown has retired, she hastens to uncover the basket, and perceives the asp, which, by her contrivance, had been introduced among the figs, to put a period to her miserable life. This contrast, a woman being the subject, of liberty and slavery, of royal power and annihilation, of voluptuousness and death; those leaves and fruits amidst which she perceives only the head and sparkling eyes of a puny reptile, prepared to terminate interests of such "great pith and moment;" and which she thus addresses, *There you are!* all these oppositions, one after another, make you shudder.

But, in order to render the person itself of *Cleopatra* interesting, there is no occasion to represent her to yourself, as our Painters and Sculptors exhibit her, an academic figure destitute of expression! a strapping virago, robust, and replete with health, with large eyes, turned toward Heaven, and wearing round her large and brawny arm a serpent twisted, like a bracelet. This is by no means a representation of the little, voluptuous Queen of Egypt, who had herself carried, as I before mentioned, packed up in a bundle of goods, on the shoulders of *Apollo-dorus*, to keep a stolen assignation with *Julius Cæsar*; at another time walking the streets of Alexandria by night, with *Anthony*, disguised as a sempstress, rallying him, and insisting that his jests, and style of humour, smelt strongly of the soldier. Still less is it a representation of the unfortunate *Cleopatra*, reduced to the extreme of ca-

lamiety, dragging up, by means of cords and chains, with the assistance of two of her women, through the window of the monument in which she had taken refuge, with her head downward, without ever letting go her hold, says *Plutarch*, that very *Anthony*, covered over with blood, who had run himself through with his own sword, and who struggled with all his remaining strength to get up, and expire in her arms.

Details are by no means to be despised ; they are frequently traits of character. To return to our Painters and Sculptors ; if they withhold the expression of motion to landscapes, to wrestlers, and to chariots in the course, they bestow it on the portraits and the statues of our great Men and Philosophers. They represent them as Angels sounding the alarm to judgment, with hair flying about, with wild wandering eyes, the muscles of the face in a state of convulsion, and their garments fluttering in the wind. These, they tell us, are the expressions of genius. But persons of genius, and great Men, are not bedlamites. I have seen some of their portraits, on antiques. The medals of *Virgil*, of *Plato*, of *Scipio*, of *Epaminondas*, nay, of *Alexander*, represent them with a serene and tranquil air. It is the property of inanimate matter, of vegetables, and of mere animals, to obey all the movements of Nature ; but it is that of a great Man, in my opinion, to have his emotions under command, and it is only in so far as he exercises this empire, that he merits the name of Great.

I have made a short digression from my subject, in order to suggest a few lessons of *conformity* to Artists, who, I am well aware, will find it much more difficult to execute, than it is easy for me to criticise. God forbid that any thing I have said should give a moment's pain to men whose works have so frequently given me exquisite pleasure. It was simply my wish to caution the ingenious against the academic manner which fetters them, and to

stimulate them to tread in the steps of Nature, and to pursue that track as far as genius can carry them.

This would be the place to speak of Music, for sounds are movements merely : But persons of much greater ability than I dare pretend to, have treated this noble Art with consummate skill. If any foreign testimony could farther confirm me in the certainty of the principles which I have hitherto laid down, it is that of Musicians of the highest reputation, who have restricted harmonic expression to three sounds. I might, as they have done, reduce to three terms the elementary generations of colours, of forms, and of motions ; but if I am not mistaken, they themselves have omitted, in their fundamental basis, the generative principle, which is *sound* properly so called, and the negative term, which is silence ; especially as this last produces effects so powerful in the movements of Music.

These proportions might be extended to the progressions of tasting, and it might be demonstrated, that the most agreeable of them have similar generations ; as we know, by experience, to be the case with regard to most fruits, whose different stages of maturity successively present five flavours, namely, the acid, the sweet, the sugary, the vinous and the bitter. They are acid while growing, sweet as they ripen, sugary in a state of perfect maturity, vinous in their fermentation, and bitter in a state of dryness. Farther, we should find that the most agreeable of these flavours, namely, the sugary, is that which occupies the middle place in this progression, of which it is the harmonic term ; that, from its nature, it forms new harmonies, by a combination with its extremes ; for the beverages which are most grateful to the palate, consist of acid and sugar, as the refreshing liquors prepared with citron juice ; or of sugar and bitter, such as coffee. But while I am endeavouring to open new paths to Philosophy, it is no part of my intention to present new combinations to voluptuousness.

Though I have a thorough conviction of the truth of these elementary generations, and am able to support them with a multitude of proofs which I have collected, in the tastes of polished, and of savage Nations, but which time permits me not, at present, to exhibit; it would, however, be a matter of no surprise to me, should many of my Readers dissent from what I have advanced. Our natural tastes are perverted from our infancy, by prejudices which determine our physical sensations, much more powerfully than these last give direction to our moral affections. More than one Churchman considers violet as the most beautiful of colours, because his Bishop wears it: More Bishops than one give scarlet the preference, because it is the Cardinal's colour; and more than one Cardinal, undoubtedly, would rather be dressed in white, because this colour is appropriated to the Head of the Church. A soldier, frequently, looks upon the red as the most beautiful of all ribbons; but his superior officer prefers the blue. Our temperaments, as well as our conditions, have an influence upon our opinions.

Gay people prefer lively colours to every other; persons of sensibility, those which are delicate; the melancholy assume the dusky. Though I myself consider red as the most beautiful of colours, and the sphere as the most perfect of forms; and though I am bound more than any other man, strenuously to adhere to this order, because it is that of my system, I prefer to the full red, the carmine colour, which has a slight shade of violet; and to the sphere, the oval, or elliptical form. It likewise appears to me, if I may venture to say so, that Nature has bestowed, by way of preference, both of these modifications on the rose, at least before it is completely expanded. Farther, I like violet flowers better than white, and still much better than such as are yellow. I prefer a branch of lilach in bloom to a pot of gilliflower,* and a Chi-

Dr. Johnson tells us that *Gilliflower* is a corruption in orthography for *Julyflower*. With due respect to so great an Etymologist, this I take to be

nese daisy, with its disk of a smoky yellow, its rumpled shaggy down, its violet and grave petals, to the most flashy cluster of sunflowers in the Luxemburg.

I am persuaded that I have these tastes in common with many other persons, and that, if we form a judgment of men from the colour of their clothes, by far the majority is rather serious than gay. I am likewise of opinion, that Nature, for to her we must ever have recourse in order to be assured that we are right, gives most of her physical beauties a tendency to melancholy. The plaintive notes of the nightingale, the deep shades of the forest, the sober lustre of the Moon, inspire no gaiety, nevertheless they interest us, and that deeply. I feel much more emotion in contemplating the setting than the rising Sun. In general, we are pleased by gay and sprightly beauties, but we are melted and touched only by those which are melancholy.

I shall endeavour, in another place, to unfold the causes of these moral affections. They stand in connexion with laws more sublime than any physical laws: While these last amuse our senses, the other speak to the heart, and calmly admonish us, that Man is ordained to a much higher destination.

It is very possible that I may be mistaken in the order of those generations, and may have transposed their terms. But all that I, from the beginning, proposed, was to open some new paths into the Study of Nature. It is sufficient for my purpose, that the effect of these generations is generally acknowledged. Men more enlightened will establish the filiations of them in a more luminous order. All that I have hitherto said on this subject, or hereafter may say, is reducible to this great Law: Every thing in Nature is formed of contraries: It is from their harmonies

a mistake. The flowering of the plant is by no means limited to the month of July. The English term is derived from the French word *Giroflier*, (the clove plant;) every one knows the striking analogy between the flavour of that spice, and the smell of the Gilliflower.

H. H.

that the sentiment of pleasure results, and out of their oppositions issues the sentiment of pain.

This Law, as we shall see, extends also to morals. Every truth, the truths of fact excepted, is the result of two contrary ideas. From this it follows, that as often as we decompose a truth, by dialectics, we divide it into the two ideas of which it is constituted; and if we confine ourselves to one of its elementary ideas, as to a detached principle, and deduce consequences from it, we shall convert it into a source of endless disputation; for the other elementary idea will abundantly supply consequences diametrically opposite to the person who is disposed to pursue them; and these consequences are themselves susceptible of contradictory decompositions, which go on without end. The Schools are admirably adapted to instruct us how to manage this process; and thither are we sent to form our judgment. There are we taught to separate the most evident truths not only into two, but, as *Hudibras* says, into four. If, for example, some one of our Logicians, observing that cold had an influence on vegetation, should think proper to maintain, that cold is the only cause of it, and that heat is even inimical to it, he would take care, no doubt, to quote the efflorescences and the vegetations of ice, the growth, the verdure, and the flowering of mosses in Winter; plants burnt up by the heat of the Sun, in Summer, and many other effects relative to his thesis. But his antagonist, availing himself, on his side, of the influences of Spring, and of the ravages of Winter, would clearly demonstrate, that heat alone gives life to the vegetable world. But the truth is, after all, that heat and cold combined form one of the principles of vegetation, not only in temperate climates, but to the very heart of the Torrid Zone.

It may confidently be affirmed, that all the disorders, in both Physics and Morals, are neither more nor less than the clashing opposition of two contraries. If men would pay attention to this Law, there would be a speedy

end put to most of their wranglings and mistakes; for it may be urged, that, every thing being composed of contraries, whoever affirms a simple proposition, is only half right, as the contrary proposition has equally an existence in nature.

There is, perhaps, in the World but one intellectual truth, pure, simple, and which does not admit of a contrary idea; it is the existence of GOD. It is very remarkable, that those who have denied it, adduce no other proofs to support their negation, but the apparent disorders of Nature, the extreme principles of which alone they contemplated: So that they have not demonstrated, that no God existed, but that He was not intelligent, or that He was not good. Their error, accordingly, proceeds from their ignorance of natural Laws. Besides, their arguments have been founded, for the most part, on the disorders of men, who exist in an order widely different from that of Nature, and who alone, of all beings endowed with perception, have been committed to their own direction.

As to the nature of GOD, I know that faith itself presents Him to us, as the harmonic principle by way of supreme excellence, not only with relation to all that surrounds Him, of which He is the Creator and Mover, but even in his essence divided into three persons. *Bassuet* has extended these harmonies of DEITY to Man, by tracing in the operations of the human Soul, some consonancy to the Trinity, of which it is the image. These lofty speculations are, I acknowledge, infinitely above my reach. Nay, I am filled with admiration to think, that the DIVINITY should have permitted beings so weak, and so transitory, as we are, to take so much as a glimpse of his omnipotence on this Earth; and that he should have veiled, under combinations of matter, the operations of his infinite Intelligence, in order to adapt it to our perception. A single act of his will was sufficient to call us into being; the slightest communication of his works is sufficient to illuminate our reason; but I have a thor-

ough persuasion, that if the smallest ray of his divine essence were to communicate itself directly to us, in a human body, we must be annihilated.

OF CONSONANCES.

Consonances are repetitions of the same harmonies. They increase our pleasures by multiplying them, and by transferring the enjoyment of them to new scenes. They farther communicate pleasure, by rendering it perceptible to us, that the same Intelligence has presided over the different plans of Nature, as it presents to us, throughout, similar harmonies. Consonances, accordingly, confer more pleasure than simple harmonies, because they convey to us the sentiments of extension, and of Divinity, so congenial to the nature of the human Soul. Natural objects excite in us a certain degree of satisfaction, only in so far as they awaken and display an intellectual feeling.

We find frequent examples of consonances in Nature. The clouds of the Horizon frequently imitate, on the Sea, the forms of mountains, and the aspects of land, and this so exactly, as often to deceive the most experienced mariners. The waters reflect from their heaving bosom, the heavens, the hills, the forests. The echoing rocks, in their turn, repeat the murmuring of the waters. As I was walking one day, in the *Païs de Caux*, along the sea-side, and considering the reflexes of the shore in the bosom of the water, I was not a little astonished to hear other waves emitting a dying sound behind me. I turned round, and perceived only a high and steep shore, the echoes of which were repeating the noise of the waves. This double consonance appeared to me wonderfully a-

greeable. You would have said there was a mountain in the sea, and a sea in the mountain.

Those transpositions of harmony, from one element to another, communicate inexpressible pleasure. Nature has multiplied them, accordingly, with boundless liberality, not only in fugitive images, but by permanent forms. She has repeated, in the midst of the Seas, the forms of Continents, in those of islands; most of which, as we have seen, have peaks, mountains, lakes, rivers and plains, proportioned to their extent, as if they were little Worlds. On the other hand, she represents in the midst of the Land, the basins of the vast Ocean, in mediterraneans, and in great lakes, which have their shores, their rocks, their isles, their volcanoes, their currents, and, sometimes, a flux and reflux peculiar to themselves, and which is occasioned by the effusions from icy mountains, at the basis of which they are commonly situated, as the currents and tides of the Ocean are, by those of the Poles.

It is singularly remarkable, that the most beautiful harmonies are those which have the most consonances. Nothing in the World, for example, is more beautiful than the Sun, and nothing in nature is so frequently repeated as his form, and his light. He is reflected in a thousand different manners by the refractions of the air, which every day exhibit him above all the horizons of the Globe, before he is actually risen, and for some time after he has set; by the parhelia which reflect his disk, sometimes twice or thrice, in the misty clouds of the North; by the rainy clouds, in which his refracted rays trace an arch shaded with a thousand various colours; and by the waters, whose reflexes exhibit him in an infinite number of places where he is not, in the bosom of meadows, amidst flowers besprinkled with dew, and in the shade of green forests. The dull and inert earth, too, reflects him in the specular particles of gravels, of micæ, of crystals and of rocks. It presents to us the form of his disk, and of his rays, in the disks and petals of the myriads of radiated flowers with

which it is covered. In a word, this beautiful star has multiplied himself to infinity, with varieties of which we know nothing, in the innumerable stars of the firmament, which he discovers to us, as soon as he quits our Horizon; as if he had withdrawn himself from the consonances of the earth, only to display to the delighted eye those of Heaven.

From this Law of consonance it follows, that what is best and most beautiful in Nature, is likewise most common, and the most frequently repeated. To it we must ascribe the varieties of species in each genus, which are so much the more numerous, in proportion as that genus is useful. For example, there is no family in the vegetable kingdom so necessary as that of the gramineous, on which subsist not only all the quadrupeds, but endless tribes of birds and insects; and there is no one, accordingly, whose species are so varied. We shall take notice, in the Study on Plants, of the reasons of this variety. I shall only remark, in this place, that it is in the gramineous families Man has found the great diversity of nutritious grains, from which he derives his chief subsistence; and that from reasons of consonance, not only the species, but several of the genera, nearly approach to each other, in order that they may present similar services to Man, under Latitudes entirely different. Thus, the millet of Africa, the maize of Brasil, the rice of Asia, the palmsago of the Moluccas, the trunks of which are filled with alimentary flower, are in consonance with the corns of Europe. We shall find consonances of another kind in the same places, as if it had been the intention of Nature to multiply her benefits, by varying only the form of them, without changing almost any thing of their qualities. Thus, in our gardens, what a delightful and beneficial consonancy between the orange and citron trees, the apple and the pear, the walnut and the filbert; and in our farm yards, between the horse and the ass, the goose and the duck, the cow and the she goat.

Farther, each genus is in consonancy with itself, from difference of sex. There are, however, between the sexes, contrasts which give the greatest energy to their loves, from the very opposition of contraries, from which, as we have seen, all harmony takes its birth : But without the general consonancy of form which is between them, sensible beings of the same genus never would have approached each other. Without this, one sex would have forever remained a stranger to the other. Before each of them could have observed what the other possessed that corresponded to its necessities, the time of reflection would have absorbed that of love, and, perhaps, have extinguished all desire of it. It is consonancy which attracts, and contrast which unites them. I do not believe that there is in any one genus, an animal of one sex entirely different from one of the other, in exterior forms; and if such differences are actually found, as certain Naturalists pretend, in several species of fishes and insects, I am fully persuaded, that Nature placed the habitation of the male and of the female very close to each other, and planted their nuptial couch at no great distance from their cradle.

But there is a consonancy of forms, much more intimate still than even that of the two sexes, I mean the duplicity of the organs which exists in each individual. Every animal is double. If you consider his two eyes, his two nostrils, his two ears, the number of his legs and arms disposed by pairs, you would be tempted to say, here are two animals glued the one to the other, and united under the same skin. Nay, the parts of his body which are single, as the head, the tail, and the tongue, appear to be formed of two halves, compacted together by seams. This is not the case with regard to the members properly so called : For example, one hand, one ear, one eye, cannot be divided into two similar halves ; but the duplicity of form in the parts of the body, distinguishes them essentially from the members : For the part of the body is double, and the member

is single : The former is always single and alone, and the latter always repeated. Thus, the head and the tail of an animal are parts of its body, and the legs and ears of it are members.

This law of Nature, one of the most wonderful and one of the least observed, destroys, at one blow, all the hypotheses which introduce chance into the organization of beings ; for, independently of the harmonies which it presents, it doubles at once the proofs of a Providence, which did not deem it sufficient to give one principal organ to each animal, adapted to each element in particular, such as the eye, for the light of the Sun ; the ear, for the sounds of the air ; the foot, for the ground which is to support it : But determined, besides, that every animal should have each of those organs by pairs.

Certain Sages have considered this admirable duplication as a predisposition of Providence, in order that the animal might have a substitute always at hand, to supply the loss of one of the double organs, exposed as they are to so many accidents ; but it is remarkable, that the interior parts of the body, which, at first sight, appear to be single, present, on closer examination, a similar duplicity of forms, even in the human body, where they are more confounded than in other animals. Thus the five lobes of the lungs, one of which has a kind of division ; the fissure of the liver ; the supernal separation of the brain, by the reduplication of the *dura mater* ; the *septum lucidum*, similar to a leaf of talc, which separates the two anterior ventricles of it ; the two ventricles of the heart ; and the divisions of the other *viscera* announce this double union, and seem to indicate, that *the very principle of life, is the consonance of two similar harmonies.**

* Each organ is itself in opposition with the element for which it is destined ; so that from their mutual opposition arises a harmony which constitutes the pleasure enjoyed by that organ. This is very remarkable, and confirms the principles which we have laid down. Thus, the organ of vision, adapted principally to the Sun, is a body singularly opposite to him,

There farther results from this duplicity of organs, a much more extensive range of utility than if they had been single. Man, by the assistance of two eyes, can take in, at once, more than half of the Horizon ; with a single one, he could scarcely have embraced a third part. Provided with two arms, he can perform an infinite number of actions which he never could have accomplished with one only ; such as raising upon his head a load of considerable size and weight, and clambering up a tree. Had he been placed upon one leg, not only would his position be much more unsteady than upon two, but he would be unable to walk ; his progressive motion would be reduced to crawling, or hopping. This method of advancing would be entirely discordant to the constitution of the other parts of his body, and to the variety of soils over which he is destined to move.

If Nature has given a single exterior organ to animals, such as the tail, it is because the use of it, being extremely limited, extends but to a single action to which it is fully equivalent. Besides, the tail, from its situation, is secured against almost every danger. Farther, hardly any but the very powerful animals have a long tail, as bulls, horses and lions. Rabbits and hares have it very short. In feeble animals, which have one of considerable length, as the thornback, it is armed with prickles, or else it grows

in that it is almost entirely aqueous. The Sun emits luminous rays ; the eye, on the contrary, is surrounded by a dusky eyebrow which overshadows it. The eye is, besides, veiled with a lid which can be raised and dropped at pleasure ; and it farther opposes to the whiteness of the light, a tunic entirely black, called the *uvea*, which clothes the extremity of the optic nerve.

The other parts of the body present, in like manner, oppositions to the action of the elements to which they are adapted. Accordingly, the feet of animals which scramble among rocks are provided with pincers, as those of tygers and lions. Animals which inhabit cold countries, are clothed with warm furs, and so on. But, with all this, we must not always reckon on finding these contraries of the same species in every animal. Nature possesses an infinite variety of means, for producing the same effects, conformably to the necessities of every individual.

again, if it happens to be torn off by an accident, as in the case of the lizard. Finally, whatever may be the simplicity of its use, this is remarkable, it is formed of two similar halves, as the other parts of the body.

There are other interior consonances, which collect diagonally, if I may use the expression, the different organs of the body, in order to form but one only and single animal of its two halves. I leave to Anatomists the investigation of this incomprehensible connexion : But, be their knowledge ever so extensive, I much doubt whether they will ever be able to trace the windings of this labyrinth. Why, for instance, should the pain which attacks a foot, make itself felt, sometimes, in the opposite part of the head, and *vice versa*? I have seen a very astonishing proof of this consonance in the case of a serjeant, who is still living, I believe, in the Hospital of Invalids. This man having a fencing bout one day with a comrade, who, as well as himself, made use of his undrawn sword, received a thrust in the lacrymal angle of the left eye, which immediately deprived him of his senses. On coming to himself, which did not happen till several hours afterward, he was found to be completely paralytic in his right leg and right arm, and no medical assistance has ever been able to restore the use of them.*

I must here observe, that the cruel experiments every day made on brutes, in the view of discovering these secret correspondencies of Nature, serve only to spread a thicker

* This foldier was of Franche Comté. I never saw him but once, and I have forgotten his name, as well as that of the regiment to which he belonged; but I have not lost the recollection of his virtuous conduct, which was reported to me on undoubted authority. When the accident above related sent him to the Invalids, he remembered that, in his capacity of serjeant, he had inveigled, at the instigation of his captain, in a country village, a young fellow to enlist, who was the only son of a poor widow, and who was killed three months afterward in an engagement. The serjeant recollecting this act of cruelty and injustice, formed the resolution of abstaining from wine. He sold his allowance as a pensioner in the Hospital of the Invalids, and remitted the amount every six months to the mother whom he had robbed of her son.

veil over them ; for their muscles, contracted by terror and pain, derange the course of the animal spirits, accelerate the velocity of the blood, put the nerves into a state of convulsion, and tend much rather to unhinge the animal economy, than to unfold it. These barbarous means, employed by our modern Physics, have an influence still more fatal on the morals of those who practise them ; for, together with false information, they inspire them with the most atrocious of all vices, which is cruelty.

If Man may presume to put questions to Nature respecting the operations which she is pleased to conceal, I should prefer the road of pleasure to that of pain. Of the propriety of this sentiment, I was witness to an instance, at a country seat in Normandy. Walking in one of the adjoining fields, with a young gentleman, who was the proprietor of them, we perceived bulls fighting. He ran up to them, with his staff brandished, and the poor animals instantly gave up their contention. He presently went up to the most ferocious of the tribe, and began to tickle him, with his fingers, at the root of the tail. The animal, whose eyes were still inflamed with rage, became motionless, with outstretched neck, expanded nostrils, transpiring the air with a satisfaction which most amusingly demonstrated the intimate correspondence between this extremity of his body and his head.

The duplicity of organs is farther observable, even in vegetables, especially in their essential parts, such as the *antheræ* of the flowers, which are double bodies ; in their petals, one half of which corresponds exactly to the other ; in the lobes of their seed, &c. A single one of these parts, however, appears to me sufficient for the expansion and the generation of the plant. This observation might be extended to the very leaves, the two halves of which are correspondent in most vegetables ; and if any one of them recedes from this order, it is, undoubtedly, for some particular reason, well worthy of investigation.

These facts confirm the distinction which we have made between the parts and the members of a body : For in the leaves where this duplicity occurs, the vegetative faculty is usually to be found, which is diffused over the body of the vegetable itself. So that if you carefully replant those leaves, and at the proper season, you will see the complete vegetable thence reproduced. Perhaps, it is because the interior organs of the tree are double, that the principle of vegetative life is diffused even over its slips, as we see it in a great number which sprout again from one branch. Nay, there are some which have the power of perpetuating themselves by cuttings simply. Of this we have a noted instance in the memoirs of the Academy of Sciences. Two sisters, on the death of their mother, became heiresses of an orange tree. Each of them insisted on having it thrown into her allotment. At length, after much wrangling, and neither being disposed to resign her claim, it was settled that the tree should be cleft in two, and each take her half. The orange tree, accordingly, underwent the judgment pronounced by *Solomon* on the child. It was cleft asunder ; each of the sisters replanted her own half, and, wonderful to be told ! the tree, which had been separated by sisterly animosity, received a new clothing of bark from the benignant hand of Nature.

It is this universal consonance of forms which has suggested to Man the idea of symmetry. He has introduced it into most of his works of art, and particularly into Architecture, as an essential part of order. To such a degree, in fact, is it the work of intelligence and of combination, that I consider it as the principal character by which we are enabled to distinguish all organized bodies from such as are not so, and are only results of a fortuitous aggregation, however regular their assemblage may appear ; such as those which produce crystallizations, efflorescences, chemical vegetations, and igneous effusions.

It was in conformity to these reflections that, on considering the Globe of the Earth, I observed with the greatest surprise, that it too presented, like every organized body, a duplicity of form. From the beginning it had been my thought, that this Globe being the production of an Intelligence, order must of necessity pervade it. I had discerned, and admired, the utility of islands, and even of that of banks, of shelves, and of rocks, to protect the parts of the Continents which are most exposed to the Currents of the Ocean, at the extremities of which they are always situated. I had, in like manner, discerned the utility of bays, which are, on the contrary, removed from the Currents of the Ocean, and hollowed into deep retreats to shelter the discharge of rivers, and to serve, by the tranquillity of their waters, as an asylum to the fishes, which in all seas retire thither in shoals, to collect the spoils of vegetation, and the alluvions of the Land, which are there disgorged by the rivers. I had admired, in detail, the proportions of their different fabrics, but had formed no conception of their combination. My mind was bewildered amidst such a multiplicity of cuttings and carvings, of land and sea; and I should, without hesitation, have ascribed the whole to chance, had not the order, which I perceived in each of the parts, suggested to me the possibility, that there might exist order also, in the totality of the Work.

I am now going to display the Globe under a new aspect. The Reader, will, I hope, forgive this digression, which exhibits to him one little fragment of the materials I had laid up, for a geographical structure, but which tends to prove the universality of the natural Laws, whose existence I am endeavouring to establish. I shall be, as usual, rapid and superficial: But it is a matter of very inferior importance to myself, should I enfeeble ideas, which I have not been permitted to arrange in their natural order, provided I am enabled to transmit the germ of them into a head superior to my own.

I first endeavoured to find out consonances between the northern and southern halves of the Globe. But so far from discovering resemblances between them, I perceived nothing but oppositions ; the northern being, if I may so express myself, a terrestrial Hemisphere only, and the southern a maritime ; and so different from each other, that the Winter of the one is the Summer of the other ; and that the seas of the first Hemisphere seem to be opposed to the lands, and to the islands, which are scattered over the second. This contrast presented to me another analogy with an organized body : For, as we shall see in the following articles, every organized body has two halves in contrast, as there are two in consonance.

I found in it then, under this new aspect, something like an analogy with an animal, the head of which should have been to the North, from the attraction of the magnet, peculiar to our Pole, which seems there to fix a *sensorium*, as in the head of an animal : The heart under the Line, from the constant heat which prevails in the Torrid Zone, and which seems to determine this as the region of the heart ; finally, the excretory organs in the southern part, in which the greatest Seas, the vast receptacles of the alluvions of Continents, are situated ; and where we, likewise, find the greatest number of volcanoes, which may be considered as the excretory organs of the Seas, whose bitumens and sulphurs they are incessantly consuming. Besides, the Sun, who sojourns five or six days longer in the Northern Hemisphere, seemed to present to me a farther, and a more marked, resemblance to the body of an animal, in which the heart, the centre of heat, is somewhat nearer to the head, than to the lower extremities.

Though these contrasts appeared to me sufficiently determinate to manifest an order on the Globe, and though I perceived something similar in vegetables, distinguished as they are into two parts, opposite in functions and in forms, such as the leaves and the roots ; I was afraid of giving scope to my imagination, and of attempting to gen-

eralife, through the weakness of the human mind, the Laws of Nature peculiar to each existence, by extending them to kingdoms, which were not susceptible of the application.

But I ceased to doubt of the general order of the Globe, when, with two halves in contrast, I found two others in consonance. I was struck with astonishment, I must confess, when I observed, in the duplicity of forms which constitute it, members exactly repeated on that side and on this.

The Globe, if we consider it from East to West, is divided, as all organized bodies are, into two similar halves, which are the Old and the New World. Each of their parts mutually corresponds in the eastern and western Hemispheres ; sea to sea, island to island, cape to cape, peninsula to peninsula. The lakes of Finland, and the gulf of Archangel, correspond to the lakes of Canada, and Baffin's bay ; Nova Zembla to Greenland ; the Baltic to Hudson's bay ; the Islands of Great Britain and Ireland, which cover the first of these mediterraneans, to the Islands of Good Fortune and Welcome, which protect the second ; the Mediterranean, properly so called, to the gulf of Mexico, which is a kind of mediterranean, formed, in part, by islands. At the extremity of the Mediterranean, we find the isthmus of Suez in consonance with the isthmus of Panama, placed at the bottom of the gulf of Mexico. Conjoined by those isthmuses, the peninsula of Africa presents itself in the Old World, and the peninsula of South America in the New. The principal rivers of these divisions of the Globe front each other in like manner ; for the Senegal discharges itself into the Atlantic, directly opposite to the river of the Amazons. Finally, each of these peninsulas, advancing toward the South Pole, terminates in a cape equally noted for violent tempests, the Cape of Good Hope, and Cape Horn.

There are, besides, between these two Hemispheres, a variety of other points of consonance, on which I shall

no longer insist. These different particulars, it is admitted, do not correspond in exactly the same Latitudes; but they are disposed in the direction of a spiral line winding from East to West, and extending from North to South, so that these corresponding points proceed in a regular progression. They are nearly of the same height, setting out from the North, as the Baltic and Hudson's bay; and they lengthen in America, in proportion as it advances toward the South. This progression makes itself farther perceptible along the whole length of the Old Continent, as may be seen from the form of its Capes, which, taking the point of departure from the East, lengthen so much the more toward the South, as they advance toward the West; such as the Cape of Kamschatka, in Asia; Cape Comorin, in Arabia; the Cape of Good Hope, in Africa; and, finally, Cape Horn, in America.

These differences of proportion are to be accounted for from this, that the two terrestrial Hemispheres are not projected in the same manner; for the Old Continent has its greatest breadth from East to West, and the New has its greater extent from North to South; and it is manifest, that this difference of projection has been regulated by the AUTHOR of Nature, for the same reasons which induced Him to bestow double parts on animals and on vegetables, in order that, if necessity required, the one might supply what was deficient in the other, but principally that they might be of mutual assistance.

If, for example, there existed only the Ancient Continent, with the South Sea alone, the motion of that Sea being too much accelerated, under the Line, by the regular winds from the East, would, after having surrounded the Torrid Zone, advance with incredible fury, and attack tremendously the Land of Japan: For the size of the billows of a Sea, is always in proportion to its extent. But from the disposition of the two Continents, the billows of the great eastern Current of the Indian Ocean, are partly retarded by the archipelagos of the Moluccas and

Philippine Islands; they are still farther broken by other islands, such as the Maldivia, by the Capes of Arabia, and by that of Good Hope, which throws them back toward the South. Before they reach Cape Horn, they have to encounter new obstacles, from the Current of the South Pole, which then crosses their course, and the change of the monsoon, which totally destroys the cause of the commotion at the end of six months. Thus, there is not a single Current, be it easterly or northerly, which pervades so much as a quarter of the Globe, in the same direction. Besides, the division of the parts of the Globe into two, is so necessary to its general harmony, that if the channel of the Atlantic Ocean, which separates them, had no existence, or were in part filled up, according to a supposition once entertained, by the great island Atlantis,* all the oriental rivers of America, and all the occidental of Europe would be dried up; for those rivers owe their supplies only to the clouds which emanate from the Sea. Besides, the Sun enlightening, on our side, only one terrestrial Hemisphere, the mediterraneans of which would disappear, must burn it up with his rays; and at the same time, as he warmed, on the other side, a Hemisphere of water only, most of the islands of which would sink of course, because the quantity of that Sea must be increased by the subtraction of ours, an immensity of vapour would arise, and go merely to waste.

It would appear that, from these considerations, Nature has not placed in the Torrid Zone the greatest length of the Continents, but only the mean breadth of America and of Africa, because the action of the Sun would there have been too vehement. She has placed there, on the contrary, the longest diameter of the South Sea, and the greatest breadth of the Atlantic Ocean, and there she has collected the greatest quantity of islands in existence. Farther, she has placed in the breadth of the Continents,

* A fabulous island imagined by *Plato*, as has been demonstrated by many learned men, allegorically to represent the Athenian Government.

which she has there lengthened out, the greatest bodies of running water that are in the World, all issuing from mountains of ice ; such as the Senegal and the Nile, which issue from the mountains of the Moon in Africa ; the Amazon and the Oronoko, which have their sources in the Cordeliers of America.

Again, it is for this reason that she has multiplied, in the Torrid Zone, and in its vicinity, lofty chains of mountains covered with snow, and that she directs thither the winds of the North Pole and of the South Pole, of which the Trade winds always partake. And it is very remarkable, that several of the great rivers which flow there, are not situated precisely under the Line, but in regions of the Torrid Zone, which are hotter than the Line itself. Thus, the Senegal rolls its stream in the vicinity of Zara, or the Desert, which, if we may credit the concurring testimony of all travellers, is the hottest part of Africa.

From all this taken together, we have a glimpse of the necessity of two Continents, to serve mutually as a check to the movements of the Ocean. It is impossible to conceive how Nature could have disposed them otherwise, than by extending one of them lengthways, and the other in breadth, in order that the opposed Currents of their Ocean might balance each other, and that there might thence result a harmony, adapted to their shores, and to the islands contained in their basons.

Were we to suppose these two Continents projected circularly, from East to West, under the two temperate Zones, the circulation of the Sea contained between the two, would be as we have seen, too violently accelerated by the constant action of the East wind. There could be no longer any communication by Sea, from the Line toward the Poles ; consequently, no icy effusions in that Ocean, no tides, no cooling, and no renovation, of its waters. If we suppose, on the contrary, both Continents extended from North to South, as America is, there would be no longer any oriental Current in the Ocean ; the two

halves of each Sea would meet in the midst of their channel, and their polar effusions would there encounter each other with an impetuosity of commotion, of which the icy effusions precipitated from the Alps, with all the dreadful ravages which they commit, convey but a faint idea. But by the alternate and opposite Currents of the Seas, the icy effusions of our Pole proceed, in Summer, to cool Africa, Brasil, and the southern parts of Asia, forcing its way beyond the Cape of Good Hope, by the Monsoon which then carries the Current of the Ocean toward the East; and, during our Winter, the effusions of the South Pole proceed toward the West, to moderate, on the same shores, the action of the Sun, which is there unremitting. By means of these two spiral motions of the Seas, similar to those of the Sun in the Heavens, there is not a single drop of water but what may make the tour of the Globe, by evaporation under the Line, dissolution into rain in the Continent, and congelation under the Pole. These universal correspondencies are so much the more worthy of being remarked, that they enter into all the plans of Nature, and present themselves in the rest of her Works.

From any other imaginable order would result other inconveniencies, which I leave the Reader to find out. Hypotheses *ab absurdo*, are at once amusing and useful; they change, it is true, natural proportions into caricatures; but they have this advantage, that, by convincing us of the weakness of our own understanding, they impress us with a deep sense of the wisdom of Nature. Let us recollect the Socratic method of ratiocination. Do not let us waste our time in overturning systems which present to us plans different from those we see. Let us only deduce consequences from them: To admit them is complete refutation.

I could farther demonstrate, that most islands themselves consist of double parts, as the Continents, of which, as I have elsewhere said, they are abridgments, from their peaks, their mountains, their lakes, and their rivers, pro-

portioned to their extent. Many of those which are situated in the Indian Ocean, have, if I may so express myself, two Hemispheres, the one oriental, the other occidental, divided by mountains which go from North to South, so that when it is Winter on one side, Summer reigns on the other, and reciprocally; such are the islands of Java, Sumatra, Borneo, and most of the Philippines and Moluccas; so that they are evidently constructed for the two Monsoons of the Ocean in which they are placed.

Did time permit, the varieties of their construction, would furnish me with many curious remarks, tending to confirm, in particular, what I have said, in general, respecting the consonances of the Globe. For my own part, I believe these principles of order to be so certain, that I am persuaded it might be possible, on seeing the plan of an island, with the elevation and the direction of its mountains, to ascertain its longitude, its latitude, and what are the winds which most regularly blow there. Nay, I farther believe, that with these last given, we might, *vice versa*, trace the plan and shape of an island, situated in whatever part of the Ocean. From this, however, I except fluviatic islands, and such as, being too small of themselves, are collected into archipelagos, as the Maldivias; because such islands have not the centre of all their adaptations in themselves, but are subordinated to the adjoining rivers, archipelagos, and continents.

It is indubitably certain that I advance no paradox, when I compare, between the Tropics, the general form of the islands which are exposed to the two Monsoons, and that of the islands which are under the regular East wind. We have just observed, that Nature had given, in a certain sense, two Hemispheres to the first, in dividing them through the middle by a chain of mountains running North and South, in order that they might receive the alternate influences of the East and West winds, which blow there, by turns, six months of the year; but in the islands situated in the South Sea and the Atlantic Ocean,

where the East wind blows incessantly from the same quarter, she has placed the mountains at the extremity of the Land, in the part most remote from the wind, that the brooks and rivers formed from the clouds, which are accumulated by that wind on their peaks, may flow through the whole extent of these isles.

I am sensible that I have elsewhere related these last observations, but I here present them in a new light. Besides, should I sometimes fall into repetition, there can be no great harm in repeating new truths, and some indulgence is due to the weakness of him who announces them.

OF PROGRESSION.

Progression is a series of consonances, ascending or descending. Wherever we meet progression, it produces exquisite pleasure, because it excites in our soul the sentiment of infinity, so conformable to our nature. I have already said, and it cannot be repeated too frequently: Physical sensations delight us only in so far as they awaken an intellectual sentiment.

When the leaves of a vegetable are arranged round its branches, in the same order that the branches themselves are round the stem, there is consonancy, as in pines; but if the branches of that vegetable are farther disposed among themselves, on similar plans, which go on diminishing in magnitude, as in the pyramidical form of firs, there is progression; and if these trees are themselves disposed in long avenues, decreasing in height and in colouring, like their particular mass, our pleasure is heightened, because the progression becomes infinite.

From this instinct of infinity it is that we take pleasure in viewing every object which presents us with a progression; as nursery grounds, containing plants of different

ages, hills flying off to the Horizon in successive elevations, perspectives without a termination.

Montesquieu has, nevertheless, remarked that, if the road from Petersburg to Moscow is in a straight line, the traveller must die upon it with languor. I have performed that journey, and can confidently affirm, from personal knowledge, that the road is very far from being in a straight line. But admitting it to be so, the languor of the traveller would arise from the very sentiment of infinity, joined to the idea of fatigue. It is this same sentiment, so delicious when it blends with our pleasures, which overwhelms us with anguish unutterable when connected with calamity; as we but too frequently experience. However, I believe that we should sink, at length, under the weight of an unbounded perspective, from its presenting infinity to us, always in the same manner; for our soul has not only the instinct of it, but likewise that of universality, that is, of every possible modification of infinity.

Nature has not formed, after our limited manner, perspectives with one or two consonances; but she composes them of a multitude of different progressions, by introducing that of plans, magnitudes, forms, colours, movements, ages, kinds, groups, seasons, latitudes, and combining with these an infinity of consonances, deduced from reflexes of light, of waters, of sounds.

Let me suppose that she had been limited to the plantation of an avenue from Paris to Madrid, with one single genus of trees, say the fig; I do not apprehend I should tire on performing that journey. I should see upon it one species of the fig tree bearing the fruit called by the Latins *mamillana*,* because it had a resemblance to a woman's breast, in Latin *mamilla*: Another species, with figs quite red, and not bigger than an olive, such as those of Mount Ida; another with white fruit; with black;

* See *Pliny's Natural History*, book xv. chap. 18.

of the colour of porphyry, and thence called, by the Ancients, *porphyritæ*. In the course of this track would likewise occur the fig tree of Hyrcania, loaded with more than two hundred bushels of fruit; the ruminal fig tree, the species under the shade of which *Romulus* and *Remus* were suckled by a she wolf; the fig tree of *Hercules*; in a word, the nineteen species enumerated by *Pliny*, and a great variety of others, unknown to the Romans and to us. Each of these species of trees would exhibit vegetables of various magnitude; young, old, solitary, in clusters; some planted by the brink of rivulets, some issuing from the clefts of rocks. Each tree would present the same variety in its fruits exposed, on one single foot, if I may use the expression, to different Latitudes, to the South, to the North, to the East, to the West, to the Sun, and under shade of the leaves: Some of them would be green, and just beginning to shoot, others violet, and cracked, their crevices stored with honey. On the other hand, we should find some, under different Latitudes, in the same degree of maturity, as if they hung upon the same tree, those which grow to the North being, in the bottom of valleys, sometimes as forward as those which, though much farther to the South, ripen more slowly, from their situation on the tops of mountains.

These progressions are to be found in the minutest of the works of Nature, and of which they constitute the principal charm. They are not the effect of any mechanical Law. They have been apportioned to each vegetable, for the purpose of prolonging the enjoyment of its fruit, conformably to the wants of Man. Thus the aqueous and cooling fruits, such as those of a ruddy hue, appear only during the season of heat; others, which were necessary in the Winter time, from their nutrimental flours, and their oils, as chestnuts and walnuts, are capable of being preserved a considerable part of the year. But those which are designed to supply the accidental demands of Mankind, those of travellers and navigators, for

instance, remain on the earth at all times. Not only are these last inclosed in shells, adapted to their preservation, but they appear upon the tree, at all seasons, and in every degree of maturity. In tropical countries, on the uninhabited shores of the islands,* the cocoa tree bears, at once, twelve or fifteen clusters of cocoa nuts, some of which are still in the bud; others are in flower; others are knit; others are already full of milk; and, finally, some are in a state of perfect maturity. The cocoa is the seaman's tree.

It is not the heat of the Tropics which gives to this tree a fecundity so constant, and so varied; for the fruits of the trees have, in the Indies, as in our climates, seasons of ripening, and after which they are seen no more till the season returns. I know of no other, except the cocoa tree and the banana, which are in fruit all the year round. This last mentioned plant is, in my opinion the most useful in the World, because its fruit makes excellent food, without any art of cookery, having a most agreeable flavour, and possessing very nutrimental qualities. It produces a cluster, or aggregation, of sixty or fourscore fruit, which come to maturity all at once; but it pushes out shoots of every degree of magnitude, which bear in succession, and at all times. The progression of fruits in the cocoa, is in the tree, and that of the fruits of the banana is in the plantation. Universally, that which is most useful, is likewise most common!

The productions of our cornfields and vineyards present dispositions still more wonderful; for, though the ear of corn has several faces, its grains come to maturity at the same time, from the mobility of its straw, which presents them to all the aspects of the Sun. The vine does not grow in form of a bush; nor of a tree; but in hedge rows; and though its berries be arranged in form of clusters, their transparency renders them throughout penetra-

* See *Francis Pyraid's Voyage to the Maldivias.*

ble by the rays of the Sun. Nature thus lays men under the necessity, from the spontaneous maturity of these fruits, destined to the general support of human life, to unite their labours, and mutually assist each other in the pleasant toils of the harvest and the vintage. The cornfield and the vineyard may be considered as the most powerful cements of society. *Bacchus* and *Ceres*, accordingly, were regarded, in ancient times, as the first Legislators of the Human Race. The Poets of antiquity frequently distinguish them by this honourable appellation. An Indian, under his banana and his cocoa tree, can do extremely well without his neighbour. It is for this reason, I believe, rather than from the nature of the climate, which is there so mild, that there are so few republics in India, and so many governments founded in force. One man can there make an impression on the field of another, only by the ravages which he commits: But the European, who sees his harvest grow yellow, and his grapes blacken all at once, hastens to summon to his assistance, in reaping his crop, not only his neighbours, but the traveller who happens to be passing that way. Besides, Nature, while she has refused to the corn plant and the vine the power of yielding their fruits at all seasons of the year, has bestowed on the flour of the one, and the wine of the other, the quality of being preservable for ages.

All the Laws of Nature have a respect to our necessities; not only those which are evidently contrived to minister to our comfort; but others frequently concur to this end so much the better, the more that they seem to deviate from it.

OF CONTRASTS.

Contrasts differ from contraries in this, that contraries act but in one single point, and contrasts in their gen-

eral combination. An object has but one contrary, but it may have many contrasts. White is the contrary of black ; but it contrasts with blue, green, red, and various other colours.

Nature, in order to distinguish the harmonies, the consonances, and the progressions of bodies, from each other, makes them exhibit contrasts. This Law is so much the less observed, the more common it is. We trample under foot truths the most wonderful, and of the highest importance, without paying the slightest attention to them.

All Naturalists consider the colours of bodies as simple accidents ; and most of them look on their very forms as the effect of some attraction, incubation, crystallization, &c. Books are every day composed, the object of which is to extend, by analogies, the mechanical effects of those Laws to the different productions of Nature ; but if they really possess so much power, How comes it that the Sun, that universal agent, has not long ere now filled the waters, the dry land, the forests, the heavens, the plains, and all the creatures over which he exercises so much influence, with the uniform and monotonous effects of his light ? All these objects ought to assume his appearance, and present only white or yellow to our eyes, and be distinguished from each other only by their shades. A landscape ought to exhibit to us no other effects but those of a cameo, or of a print. Latitudes, we are told, diversify the colour of them. But if Latitudes have this power, How comes it to pass, that the productions of the same climate, and of the same field, have not all the same tints ? Whence is it that the quadrupeds, which are born and die in the meadow, do not produce young ones green as the grass on which they feed ?

Nature has not satisfied herself with establishing particular harmonies in every species of beings, in order to characterize them ; but that they might not be confounded among themselves, she exhibits them in contrasts. We shall see, in the following Study, for what particular rea-

son she has bestowed upon herbs a green hue, in preference to every other colour. In general she has made herbs green, to detach them from the earth; and then she has given the colour of the earth to animals which live on herbage, to distinguish them, in their turn, from the ground over which they stray. This general contrast may be remarked in the herbivorous quadrupeds, such as the domestic animals, the yellow beasts of the forests and in all the granivorous birds, which live among herbage, or in the foliage of trees, as the hen, the partridge, the quail, the lark, the sparrow, and many others, which are of earthy colours, because they live among verdure. But those, on the contrary, who live on dingy grounds are clad in brilliant colours, as the bluish tomtit, and the woodpecker, which scramble along the rind of trees in pursuit of insects, and many others.

Nature universally opposes the colour of the animal to that of the ground on which it is destined to live. This most admirable Law admits not of a single exception. I shall here produce a few examples of it, to put my Reader in the way of observing those delightful harmonies, of which he will find abundant proofs in every climate. There is seen, on the shores of India, a large and beautiful bird, white and fire coloured, called the *flamingo*, not that it is of *Flemish* extraction, but the name is derived from the old French word *flambant*, (flaming) because it appears, at a distance, like a flame of fire. He generally inhabits in swampy grounds, and salt marshes, in the waters of which he constructs his nest, by raising out of the moisture, of a foot deep, a little hillock of mud a foot and a half high. He makes a hole in the summit of this little hillock; in this the hen deposits two eggs, and hatches them, with her feet sunk in the water, by means of the extreme length of her legs. When several of these birds are sitting at the same time on their eggs, in the midst of a swamp, you would take them at a distance, for

the flames of a conflagration, bursting from the bosom of the waters.

Other fowls present contrasts of a different kind on the same shores. The pelican, or wide throat, is a bird white and brown, provided with a large bag under its beak, which is of excessive length. Out he goes every morning to store his bag with fish : And, the supply of the day having been accomplished, he perches on some pointed rock, on a level with the water, where he stands immovable till the evening, says Father *Du Tertre*,* “ as in a state of profound sorrow, with the head drooping, from the weight of his long bill, and eyes fixed on the agitated Ocean, as motionless as a statue of marble.” On the dusky strand of those seas may frequently be distinguished herons white as snow, and in the azure plains of the sky, the pailleur of a silvery white, skimming through it almost out of sight : He is sometimes glazed over with a bright red, having likewise the two long feathers of his tail the colour of fire, as that of the South Seas.

In many cases, the deeper that the ground is, the more brilliant are the colours in which the animal, destined to live upon it, is arrayed. We have not, perhaps, in Europe, any insect with richer and gayer clothing than the sterco-raceous scarab, and the fly which bears the same epithet. This last is brighter than burnished gold and steel ; the other of a hemispherical form, is of a fine blue, inclining to purple : And in order to render the contrast complete, he exhales a strong and agreeable odour of musk.

Nature seems, sometimes, to deviate from this Law, but then it is from other reasons of conformity, according to which all her plans are adjusted. Thus, after having contrasted, with the ground on which they live, the animals capable of making their escape from every danger by their strength, or their agility, she has confounded those whose slowness, or weakness, would expose them to the assaults.

* History of the Antilles.

of their enemies. The snail, which is destitute of sight, is of the colour of the bark of the trees which he gnaws, or of the wall in which he takes refuge.

Flat fishes which are indifferent swimmers, such as the turbot, the flounder, the plaice, the burt, the sole, and several others, which are cut out, as it were, from a thin plank, because they were destined to a sedentary life, close to the bottom of the Sea, are of the colour of the sands where they find their nourishment, being spotted, like the beach, with gray, yellow, black, red and brown. They are thus speckled, I admit, only on one side ; but to such a degree are they possessed of the feeling of this resemblance, that when they find themselves inclosed within the parks formed on the strand to entrap them, and observing the tide gradually retiring, they bury their fins in the sand, expecting the return of the tide, and present to the eye only their deceitful side. It has such a perfect resemblance to the ground on which they squat, to conceal themselves, that it would be impossible for the fishermen to distinguish them from it, without the help of sickles, with which they trace small fosses, in every direction, along the surface of the sand, to detect by the touch what the eye could not discern. Of this I have been a witness oftener than once, much more highly amused at the dexterity displayed by the fishes, than at that of the fishermen.

The thornback, on the contrary, which is also a flat fish, and a bad swimmer, but carnivorous, is marbled with white and brown, in order to be perceived at a distance by other fishes ; and to prevent their being devoured, in their turn, by their enemies, which are very alert, such as the sea dog, or by their own companions, for they are extremely voracious, Nature has clad them in a prickly mail, particularly on the posterior part of the body, as the tail, which is most exposed to attack when they fly.

Nature has bestowed at once, in the colours of innoxious animals, contrasts with the ground on which they live, and consonances with that which is adjacent, and has

superadded the instinct of employing these alternately, according as good or bad fortune prompts. These wonderful accommodations may be remarked in most of our small birds, whose flight is feeble, and of short duration. The gray lark finds her subsistence among the grass of the plains? Does any thing terrify her? She glides away, and takes her station between two little clods of earth, where she becomes invisible. On this post she remains in such perfect tranquillity, as hardly to quit it when the foot of the fowler is ready to crush her.

The same thing is true of the partridge. I have no doubt that these defenceless birds have a sense of those contrasts and correspondencies of colour, for I have remarked it even in insects. In the month of March last, I observed, by the brink of the rivulet which washes the Gobelins,* a butterfly of the colour of brick, reposing with expanded wings on a tuft of grass. On my approaching him, he flew off. He alighted, at some paces distance, on the ground, which, at that place, was of the same colour with himself. I approached him a second time; he took a second flight, and perched again on a similar stripe of earth. In a word, I found it was not in my power to oblige him to alight on the grass, though I made frequent attempts to that effect, and though the spaces of earth which separated the turfy soil were narrow, and few in number.

This wonderful instinct is, likewise, conspicuously evident in theameleon. This species of lizard, whose motion is extremely slow, is indemnified for this, by the incomprehensible faculty of assuming, at pleasure, the colour of the ground over which he moves. With this advantage, he is enabled to elude the eye of his pursuer, whose speed would soon have overtaken him. This faculty is in his will, for his skin is by no means a mirror.

* A small village in the suburbs of Paris, noted for its manufactures in fine tapestry, and superb mirrors.

It reflects only the colour of objects, and not their form. What is farther singularly remarkable in this, and perfectly ascertained by Naturalists, though they assign no reason for it, he can assume all colours; as brown, gray, yellow; and especially green, which is his favourite colour, but never red. Theameleon has been placed, for weeks together, amidst scarlet stuffs, without acquiring the slightest shade of that colour. Nature seems to have withheld from the creature this shining hue, because it could serve only to render him perceptible at a greater distance; and, farther, because this colour is that of the ground of no species of earth, or of vegetable, on which he is designed to pass his life.

But, in the age of weakness and inexperience, Nature confounds the colour of the harmless animals, with that of the ground on which they inhabit, without committing to them the power of choice. The young of pigeons, and of most granivorous fowls, are clothed with a greenish shaggy coat, resembling the mosses of their nests. Caterpillars are blind, and have the complexion of the foliage, and of the barks, which they devour. Nay, the young fruits, before they come to be armed with prickles, or inclosed in cases, in bitter pulps, in hard shells, to protect their seeds, are, during the season of their expansion, green as the leaves which surround them. Some embryos, it is true, such as those of certain pears, are ruddy or brown; but they are then of the colour of the bark of the tree to which they belong. When those fruits have inclosed their seeds in kernels or nuts, so as to be in no farther danger, they then change colour. They become yellow, blue, gold coloured, red, black, and give to their respective trees their natural contrasts. It is strikingly remarkable, that every fruit which has changed colour has seed in a state of maturity.

The insects, in like manner, having deposited their robes of infancy, and now committed to their own experience, spread abroad over the World, to multiply the

harmonies of it, with the attire and the instincts which Nature has conferred upon them. Then it is that clouds of butterflies, which, in their caterpillar state, were confounded with the verdure of plants, now oppose the colours and the forms of their wings, to those of the flowers; the red to the blue, the white to the red, the *antennæ* to the *stamina*, and fringes to the *corollæ*. I was one day struck with admiration at one of these, whose wings were azure, and besprinkled with specks of the colour of Aurora, as he reposed in the bosom of a full blown rose. He seemed to be disputing beauty with the flower. It would have been difficult to determine which way to adjudge the prize, in favour of the butterfly or of the rose; but, on seeing the flower crowned with wings of *lapis lazuli*, and the azure insect deposited in a goblet of carmine, it was obvious, on the slightest glance, that their charming contrast greatly enhanced their mutual beauty.

Nature does not employ those agreeable correspondencies and contrasts in the decoration of noxious animals, nor even of dangerous vegetables. Of whatever kind the carnivorous, or venomous animals, may be, they form, at every age, and wherever they are, oppositions harsh and disgusting. The white bear of the North announces his approach over the snow, by a hollow noise, by the blackness of his snout and paws, and by a throat and eyes the colour of blood. The ferocious beasts, which hunt for their prey in the gloom of darkness, or in the solitude of the forests, give notice of their presence by loud roarings, lamentable cries, eyes inflamed, urinous or fetid smells. The crocodile, in ambush among the flags, upon the shores of the rivers in Asia, where he assumes the appearance of the trunk of a tree turned upside down, betrays himself from afar, by strong exhalations of the smell of musk. The rattlesnake, concealed in the grassy swamps of America, cannot stir without sounding his ominous alarm. The very insects which make war on others, are clad in sable attire, in which colours are harshly opposed, and in which

black, particularly, predominates, and clashes disagreeably with white, or yellow. The humblebee, independently of his buzzing noise, announces himself by the blackness of his breastplate, and his large belly bristled over with yellow hairs. He appears amidst the flowers, like a burning coal half extinguished. The carnivorous wasp is yellow, and striped with black, like the tiger. But the useful bee is of the complexion of the *stamina* and of the *calices* of the flowers, among which she reaps her innocent harvests.

Poisonous plants present, like noxious animals, disgusting contrasts, from the livid colours of their flowers, in which black, deep blue, and a smoky violet, are in harsh opposition with the tender shades; from their nauseous and virulent smells; from their prickly foliage, of a black green hue, and clashing with white on the under side: Such are the aconite tribes. I am acquainted with no plant of an aspect so hideous as those of this family, and, among others, that which the French denominate *napel* the most venomous vegetable of our climates. I shall not take upon me to determine, whether the embryos of their fruits do not disclose, from the very first moments of their expansion, harsh oppositions, which give warning of their malefic characters: If it be so, they have this farther resemblance in common to them with the young of ferocious animals.

Such of the brute creation as are intended to live on two different grounds, are impressed with a double contrast in their colours. Thus, for example, the kingfisher, which skims along rivers, is at once musk coloured, and glazed over with azure; so as to be detached from the dusky shores by his azure colour, and from the azure of the waters by his musk colour. The duck, which dabbles on the same shores, has the body tinged of an ash colour, while the head and neck are of an emerald green; so that he is perfectly distinguishable, by the gray colour of his body, from the verdure of the aquatic plants among which

he waddles, and by the verdure of his head and neck, from the dark coloured mud where he finds part of his food, and in which, by another most astonishing contrast, he never soils his plumage.

The same contrasts of colour are observable in the woodpecker, who lives on the trunks of trees, along which he scrambles in quest of the insects that are lodged under their rind. This bird is at once green coloured and brown ; so that, though he lives, properly speaking, in the shade, he is always perceptible, however, on the trunk of trees ; for he detaches himself from their dusky rind, by means of that part of his plumage which is of a brilliant green, and from the verdure of their mosses and lichens, by those of his feathers, which are brown.

Nature opposes, then, the colours of every animal to those of the respective ground on which it is to be placed ; and what confirms the truth of this Law is, that the greatest part of birds which live on one ground only, have but a single colour, and that one strongly contrasted with the colour of the ground. Accordingly, the birds which live aloft in the air, on the azury ground of the Heavens, or on the bosom of the waters, in the midst of lakes, are mostly white, which, of all colours, forms the most striking contrast with blue, and is, consequently, most adapted to render them perceptible at a distance. Such are, between the Tropics, the pailencu, a bird of a glossy white, whose flight is through the superior regions of the air, the heron, the gull, the seamew, which skim along the surface of the azure deep, and the swan, fleets of which navigate the extensive lakes of the North.

There are likewise others which, in order to form a contrast with those that I have last mentioned, detach themselves from the skies and from the waters, by their black, or dusky colours : Such are, for example, the crow, in our own climates, which is perceptible at so great a distance in the Heavens, on the white ground of the clouds ; many sea fowls of a brown and blackish colour, as the fri-

gat of the Tropics, which plays through the air, amidst storm and tempest; the mower, or seacutter, a water bird, which grazes with his dark coloured wings, shaped like a scythe, the white surface of the foamy billows of the Ocean.

From these examples, therefore, it may be inferred, that when an animal is invested with but one single tint, he is intended but for one situation; and when he combines in himself the contrast of two opposite tints, that he lives on two grounds, the colours themselves of which are determined by that of the plumage, or of the hair, of the animal. We must be upon our guard, at the same time, against an unlimited generalization of this Law. We ought to consider it as harmonizing with the exceptions which wise Nature has introduced and established, for the very preservation of animals; such as, in general, the whitening of them, to the North, in the Winter season, and on lofty mountains, as a remedy against excess of cold, by arraying them in a colour which reflects the most heat; and embrowning them to the South, during the ardors of Summer, and on sandy districts, and thereby sheltering them from the effects of burning heat, by the intervention of absorbent colours. What evidently demonstrates, that these great effects of harmony are not mechanical results of the influence of the bodies which surround animals, or of the apprehensions of the mother on the tender organs of the fœtus, or of the action of the rays of the Sun on their plumage, according to the explications hitherto attempted by our systems of physics; what evidently demonstrates this, I say, is, that among the almost infinite number of birds which pass their life in the higher regions of the air, or on the surface of the Seas, whose colours are azure, there is not a single bird of the colour of blue; and that, on the contrary, many birds which live between the Tropics, in the bosom of black rocks, or under the shade of fullen forests, are azure coloured: Such are the Batavia hen, which is blue all over; the Dutch pigeon of the Isle of France, and many others.

Another consequence, equally important, may be deduced from these observations ; it is this, that all these harmonies are contrived for the use of Man. A blue coloured fowl, on the azure ground of the sky, or on the surface of the waters, would elude our sight. Nature, besides, has reserved the rich and agreeable colours only for the birds which live in our vicinity. This is so indubitably certain, that though the Sun acts between the Tropics with the whole energy of his rays, on the fowls whose residence is the wide Ocean, there is not a single one of them arrayed in a beautifully coloured plumage, whereas those which inhabit the shores of the Seas, and of the rivers, are frequently dressed in the most gorgeous attire. The flamingo, a tall bird, which lives in the swampy shores of the South Seas, has a white plumage charged with carmine. The toucan, on the same strands, has an enormous bill of the most lively red ; and when he retires from the bosom of the humid sands, where he finds his food, you would be tempted to say, that he has just fished out of them a stump of coral. There is another species of toucan, whose beak is white and black, as finely polished as if it consisted of ebony and ivory. The pintada, with speckled plumage, the peacock, the duck, the kingfisher, and a multitude of other river birds, embellish, by the enamel of their colours, the banks of the Asiatic and African streams. But we find nothing once to be compared with them, in the plumage of such as inhabit the open Sea, though they are still more exposed to the influences of the Sun.

As a farther consequence of these correspondencies with Man, Nature has given to the birds which live remote from him, cries shrill, hoarse and piercing, but which are as proper as their ill assorted colours, to render them perceptible at a distance, amidst their wild retreats. She has bestowed, on the contrary, sweet notes and melodious voices on the little birds which people our groves,

and domesticate themselves in our habitations, in order to heighten our delight, as well by the music of their warbling as by the beauty of their colours. We repeat it, in order to confirm the truth of the principles of the harmonies which we are laying down : Nature has established an order of beauty so real, in the plumage and the song of birds, that she has endowed with these such birds only, whose life was in some sort innocent relatively to Man, as those which are granivorous, or which live on insects ; and she has denied those advantages to birds of prey, and to most sea fowls, which in general, have earthy colours, and disagreeable cries.

All the kingdoms of Nature present themselves to Man with the same correspondencies, the abysses of the Ocean themselves not excepted. The fishes which live on animal substances, as the whole class of the cartilaginous do, such as the seal, the sea dog, the shark, the slipper, the thornback, the polypus, and many others, have disgusting forms and colours. Fishes which live in the open sea, have colours marbled with white, black, brown, which distinguish them in the bosom of the azure billows, such are whales, blowers, porpoises, and others. But it is among those which frequent the dusky shores, and particularly in the number of such as are denominated *saxatile*, because they live among the rocks, that we find the fishes, the lustre of whose skin and scales far surpasses all the efforts of the pencil, especially when they are alive. It is thus that legions of mackarel and herrings diffuse the radiance of silver and azure over the northern strands of Europe.

It is around the black rocks which bound the Seas of the Tropics, that the fish known by the name of *captain* is caught. Though his colours vary with the latitude, it is sufficient, in order to convey an idea of his beauty, to detail the description given of it by *Francis Cauche*,* in a

* Consult *Francis Cauche*, his relation of Madagascar.

species caught on the coasts of Madagascar. He says, that this fish, which takes pleasure in the rocks, is streaked in the form of lozenges ; that his scales are of a pale gold colour, and that his back is coloured and glazed over with laca, inclining, in several places, toward vermilion. His dorsal fin and tail are waved with azure, fading away into green toward the extremities.

About the bottom of the same rocks is likewise found the magnificent fish called the *Jardin*, and by the Brazilians *acara pinima*, of which *Marcgrave* has given the figure in his 4th Book, Chap. 6. This beautiful fish is adorned with scales of at once a gold and silver hue, crossed from head to tail by black lines, which admirably heighten their lustre. The same Author describes a variety of species of the moon fish, besides, which frequent the same places.

For my own part, I have amused myself on the rocks of the Island of Ascension, in observing, for hours together, the moon fish sporting amidst the tumultuous waves, which are incessantly breaking upon them. These fishes, of which there are various species, have the rounded, and sometimes sloping form of the orb of night, whose name they bear. They are, besides, like her, of the colour of polished silver. They seem destined to elude the sagacity of the fisherman, in every possible way ; for they have their belly streaked with black cross stripes, of a lozenge form, which gives them all the appearance of being caught in a net ; they seem, every instant, on the point of being tossed on shore, by the agitation of the billows in which they play ; farther, their mouth is so small, that they frequently nibble away the bait without touching the hook ; and their skin, without scales, like that of the seal, is so hard, that the harpoon often misses its blow, be the prongs ever so keenly whetted. *Francis Cauche* likewise says, that it requires a very violent exertion to make an incision into their skin with the sharpest knife.

It is on the same shores of Ascension Island that we find the *murena*, a species of lamprey, or eel of the rocks, which is excellent food, and whose skin is besprinkled with gilded flowers. It may be affirmed, in general, that every rock in the sea is frequented by a multitude of fishes, of the most brilliant colours ; such as the gilt head, the perroquet, the zebra, the roach, and others without number, the very classes of which are unknown to us. The more that the rocks and shallows of any sea are multiplied, the more varied, likewise, are the species of the saxatile fishes which resort thither. For this reason it is, that the Maldivia Islands, which are so numerous, furnish themselves alone a prodigious multitude of fishes, of very different colours and forms, with the greatest part of which our Ichthologists are hitherto totally unacquainted.

As often, therefore, as you see a brilliant fish, you may be assured that his habitation is near the shore, and that, on the contrary, he lives in the open Ocean, if he is of a dark colour. The truth of this may be ascertained by ourselves, in the channels, and on the banks of our own rivers. The silver smelt, and the blay, whose scales are employed in the formation of mock pearls, play on the strand of the Seine ; whereas the eel, of the gloomy colour of slate, takes pleasure to dabble in the midst, and at the bottom of the stream. We must not, however, pretend to generalize these Laws, to the exclusion of all exceptions. Nature, as has been said, subjects all to the mutual adaptation of beings, and to the enjoyment of Man. Thus, for example, though the fishes on the shores have, in general, shining colours, there are, however, several species of them invariably of a dark colour. Such are, not only those which swim indifferently, as soles, turbot, &c. but those also which inhabit some parts of the shores whose colours are lively. Thus the tortoise, which pastures at the bottom of the sea, on green herbs, or which crawls by night over the white sands, there to deposit her eggs, is of a shady colour ; thus the lamenteine, which en-

ters into the channel of the rivers of America, in quest of food, in the verdure of their banks, without leaving the water; detaches himself from that verdure, by the brown colour of his skin.

The faxatile fishes, which can easily insure their safety among the rocks, by agility in swimming, or by the facility of finding a retreat in their cavernous receptacles, or of there defending themselves against their enemies, by the armour which Nature has bestowed, have all of them lively and shining colours, the cartilaginous excepted: Such are the blood coloured crabs, the azure and purple lobsters, called *langouste* and *homard*, and, among others, that to which *Rondelet* has given the name of *Thetis*, on account of its beauty, the violet coloured urchins, armed with points and spears, the nerits, inclosed in a spiral case, with rose and gray coloured ribbons winding round it, and an endless variety of others.

It is very remarkable that all shell fish which walk and migrate, and, consequently, have the power of choosing their asylum, are those, in their kind, which have the richest colours: Such are the nerits which I have just mentioned, the purple fish, or Venus shell, resembling polished marble, the olives, shaded like velvet of three or four colours, the harp, embellished with the tints of the most beautiful tulips, the tunny, speckled like the partridge's wing, which walks along under the shade of the madre-pores; and all the families of the univalves, which force their way into the sand for shelter, the bivalves, as the ducal cloak, scarlet coloured and orange, and a multitude of other migrating shell fish, are impressed with colours the most lively, and form, with the different grounds of the Sea, secondary harmonies totally unknown.

But those which do not change their situation, as most of the oysters of the seas to the southward, which frequently adhere to the rocks, or those which are perpetually at anchor in straits, as muscles and the *pinnamarina*, attached to pebbles by threads, or those which rest on the

bosom of the madrépores, like vessels on the stocks, as the Noah's ark, or those which are entirely buried in the heart of calcareous rocks, as the dail of the Mediterranean, or such as are immoveable, from their weight, which sometimes exceeds that of several quintals, and pave the surface of flats, as the thuilée of the Moluccas, and the large bivalves, as the rocks, the burgos, &c. or those, in a word, which, I believe, are blind, like our land snails, such as lempits, which fasten themselves, by the formation of a vacuum, on the shining surface of the rocks, are of the colour of the ground which they inhabit, in order to be less perceptible to their enemies.

It is, farther, very highly worthy of observation, that though many of those sedentary shell fish are clothed in a brown and shaggy outward garment, as those which are called cornets and rollers; or with a black pellicle of the shade of the pebbles to which they are attached, as the Magellan muscles; or encompassed with a mud coloured tartar, as the lempit and the burgo: They have, under their gloomy upper coats, pearly appearances, and tints, the beauty of which frequently exceed those of the shell fish whose apparent colours are the most brilliant. Thus the Magellan lempit, cleansed of its tartar by means of vinegar, presents the richest of cups, shaded with the colours of the finest tortoise shell, and blended with a burnished gold, which is perceptible through a chesnut coloured varnish. The large muscle of Magellan's strait conceals, in like manner, under its black coat, the oriental shades of the aurora.

It is impossible to ascribe, as in the shell fish of India, colours so charming, to the action of the Sun on these shells, covered as they are with tartars and rough coats, and which are the clothing of fish that live, beside, in a foggy climate, abandoned for a great part of the year to gloomy Winters and long tempests. We may venture to affirm, that Nature has veiled their beauty, only to preserve it for the enjoyment of Man, and has placed them

only on the verge of the shores, where the Sea purifies them, by tossing them about, to put them within his reach. Thus, by a most wonderful contrast, she places the most brilliant shells, in regions the most exposed to the ravages of the elements; and, by another contrast, no less astonishing, she presents to the poor Patagonians spoons and cups, the lustre of which far surpasses, beyond all contradiction, the richest plate of polished Nations.

Hence it may be inferred, that fishes in general, and shell fish in particular, which have two opposite colours, live on two different grounds, as we have observed in the case of birds, and that those which have only one colour frequent only one ground. I recollect, that on making the tour of the Isle of France, on foot, along the shore of the Sea, I found upon it nerits with an ash gray ground, encircled with red ribbons, sometimes on the dusky rocks, sometimes on the white madrépores, with their peach coloured flowers. They contrasted in the most agreeable manner, and appeared at the bottom, on the sea plants, like fruit growing upon them. I likewise found there the Venus shell, completely white, with a rose coloured mouth, swelled backward like eggs, from which too they sometimes borrow their name. But it is now impossible for me to affirm, with certainty, whether they adhered to the dark coloured rocks, or to the white madrépores.

There are likewise to be found, on the coasts of Normandy, in the district of Caux, two sorts of rocks, the one of white marl, detached from the cliffs, the other formed of black bissets, which are amalgamated with the craggy cliff. Now, I never saw there, in general, but two sorts of periwinkles, called by the country people *vignots*, the one very common, and used as food, which is quite black, and the other white, with a faint red mouth. I presume not, at this distance, to aver, whether the white periwinkles attach themselves to the white rocks, and the black periwinkles to the black rocks, or contrariwise, for

I did not make the observation. But whether they form with those rocks consonances or contrasts, it is very singular that, as there are but two species of rocks, so there should be but two species of periwinkles. I am inclined to believe, that the black periwinkle adheres, in preference, to the black rock ; for I have observed, in the Isle of France, that there is neither black coloured periwinkle, nor muscle, because there is in those seas no pebble, or rock, precisely of that colour ; and I am perfectly certain, that muscles are always of the colour of the ground on which they live : Those of the Isle of France are brown.

It must not be concluded, on the other hand, that such shell fish are indebted, for their colours, to the rocks on which they adhere by suction ; for it would thence follow, that the rocks of Magellan's strait, which produce muscles and lempits so rich in colouring, should be themselves inlaid with mother of pearl, opal and amethyst ; besides, every rock maintains shell fish of very different colours. You find, at the bottom of the rocks on the coast of the district of Caux, which are loaded with black periwinkles, the azure coloured lobster, the crab marbled with red and brown, legions of muscles of a deep blue, with lempits of an ash gray. All these fishes, when alive, form harmonies the most agreeable, with a multitude of marine plants, which fringe those black and white rocks, with their tints of purple, gray, rust coloured, brown and green ; and with the variety of their forms and aggregations, like oaken boughs, tufts of different shapes, garlands, festoons, and long cordage, agitated by the waves in every possible manner. In truth, there is no Painter capable of composing similar groups, let him give what scope he pleases to his imagination. Many of those marine harmonies have escaped me, for I then considered them as merely the effect of chance. I looked at them, I admired them, but I observed them not : I suspected, however, even then, that the pleasure which their harmonic combination in-

spired, must be referable to some Law with which I was unacquainted.

Enough has been said to demonstrate how much Naturalists have mutilated the finest portion of Natural History, by retailing, as they for the most part do, isolated descriptions of animals and of plants, without saying a word of the season when, and of the place where, they are to be found. By this negligence they strip them of all their beauty; for there is not an animal, nor a plant existing, whose harmonic point is not fixed to a certain situation, to a certain hour of the day, or of the night, to the rising, or the setting of the Sun, to the phases of the Moon, nay, to the very tempests; to say nothing of the other contrasts, and correspondencies, which result from these.

I am so thoroughly persuaded of the existence of all those harmonies, that I entertain not the slightest doubt, but, on seeing the colour of an animal, one might be able to determine, nearly, that of the ground which it inhabits; and that by following up those indications, a road might be paved to very curious discoveries. For example, we have not hitherto found on any shore the *corne d'ammon*, that fossil so common, and of a size so considerable, in our quarries. I think we ought to look for that brown coloured shell fish in grassy marine places, such as those in which the sea tortoise pastures. I do not know that any one has hitherto thought of dragging those bottoms, because of the abundance of sea plants which grow upon them, and because they are frequently of a great depth, and at a great distance from the coasts, such as those which surround the Cape de Verd islands, or, according to others, toward Florida, and which, at certain seasons, set their herbage a floating in such quantities, that the Sea is covered with it for the space of thirty or forty leagues, and ships can with difficulty force their way through it. If the most brilliant shells are to be found on dark grounds, dusky shells ought to be found on green grounds.

We meet with those contrasts even in the brute soils of the earth, as I could evince to demonstration, did time permit. The following simple strain of reasoning is sufficient to ascertain the truth of this. If an uniform and mechanical cause had produced the Globe of the Earth, it must have been universally of the same matter, and of the same colour; the hills, the mountains, the rocks, the sands, must have been amalgams, or the rubbish, of each other; but this is not found to be the case in any one district, of however small extent. In general, as has been said, the soil is white to the North, and dark coloured to the South, in order to reflect the heat in the first case, and to absorb it in the second; but notwithstanding these general dispositions, you find in every place, in particular, the most wonderful variety. In the same canton may be found red mountains, black rocks, white plains, and yellow sands. Their substance is as much varied as their colour; there are granites, calcareous stones, gypses or plasters, and vitrifiable sands.

In the Isle of France, the rocks of the mountains are blackish, the earth in the valleys is red, and the sands on the shore are white. The rocks there are vitrifiable, and the sands calcareous. When I was in that island, a private adventurer having formed the plan of a glass manufactory, the process turned out the directly contrary of what he had proposed; for, upon lighting up his furnace with great formality and pomp, the sand, of which he expected to make glass, changed into chalk, and the stones of his furnace became vitrified. Though it be a rare thing to see white earths between the Tropics, white sands are, however, common there, upon the shores. It is certain that this colour, from its lustre, and its refraction to the Horizon, renders low lands perceptible at a very great distance, as has been well remarked by *John Hugo de Linschotten*, who, but for those sentinels planted by Nature on most of the gloomy and low coasts of India, must there have several times made shipwreck. On the coasts

of the *Païs de Caux* the sands are gray, but the cliffs are white; together with this, they are divided into black and horizontal stripes of pebbles, which form contrasts very perceptible at a great distance.

There are places where we find white rocks, and red lands, as in quarries of mill stone; from these result very agreeable effects, especially in connexion with their natural accessories of vegetables, and of animals. I should digress too far, were I to enter into any detail on this subject. It is sufficient for me, at present, to recommend to Naturalists to study Nature, as the great Painters do; that is, by uniting the harmonies of the three kingdoms. Every one, who shall observe in this manner, will find a new light diffused over the perusal of Voyages and of Natural History, though their Authors scarcely ever speak of those contrasts, except by chance, and without expressing any doubt about the matter. But every man will be himself in a condition to discover their delightful effects, in what is called brute Nature, I mean that with which Man has not intermeddled. Let me suggest the infallible means of distinguishing them: It is simply this, as often as a natural object presents to you a sentiment of pleasure, you may rest assured that it exhibits some harmonic concert.

Beyond all doubt, animals and plants of the same climate have not received from the Sun, nor from the elements, liveries so varied, and so characteristic. A thousand and a thousand new observations may be made upon their contrasts. He who has not seen them in their natural place, has not yet become acquainted with their beauty, or their deformity. Not only are they in opposition to the grounds of their respective habitations, but they are so likewise between themselves, as to genus and genus; and it is worthy of remark, that, when these contrasts are established, they exist in all the parts of the two individuals. We shall speak somewhat of those of plants in the following Study, by simply glancing at that delightful and inexhaustible subject.

Those of animals are still farther extended ; they are opposed not only in forms and in gestures, but in instincts ; and with differences so decidedly marked, they love to associate with each other, in the same places. It is this consonance of tastes which distinguishes, as I have said, beings which are in contrast, from those which are contrary, or enemies. Thus the bee and the butterfly extract the nectar of the same flowers ; the singlehoofed horse, snuffing up the wind, with his mane flowing over his graceful neck, delights to amble about airily over the same meadows on which the ponderous bull impresses his cloven foot ; the dull and steady ass takes pleasure in scrambling over the rocks where the nimble and capricious goat frisks and bounds ; the cat and the dog live peaceably by the same fire side, unless where the tyranny of Man has vitiated their dispositions, by a treatment calculated to excite hatreds and jealousies between them.

Finally, contrasts exist not only in the Works of Nature in general, but in each individual in particular, and constitute, as well as consonances, the organization of bodies. If you examine one of those bodies, of whatever species it may be, you will remark in it forms absolutely opposite, and, nevertheless, consonant. It is thus that, in animals, the excretory organs contrast with those of nutrition. The long tails of horses and bulls are opposed to the large size of their heads and of their necks, and come in as a supplement to the motions of these anterior parts, which are too unwieldy to drive away the insects that infest them. On the contrary, the broad tail of the peacock forms a contrast with the length of the neck, and the smallness of the head, of that magnificent bird. The proportions of other animals present oppositions which are no less harmonic, nor less happily adapted to the necessities of each species.*

* This Law of contrasts is, if I am not mistaken, a delicious source of observation and discovery. The women, I repeat it, always nearer to Nature than we are, employ it continually in the assortment of the colours which they use in dress, whereas no Naturalist, as far as I know, has ever

Harmonies, consonances, progressions, and contrasts, must, therefore, be reckoned among the first elements of Nature. To these we are indebted for the sentiments of

observed that Nature herself acts in conformity to it, in the harmony of all her Works. Any one may find a demonstration of this, without stirring beyond his own house. For example, though there be among dogs a singular variety of colours, never was any one seen red, green, or blue: But they are, for the most part, of two opposite tints, the one clear, and the other dark, in order that in whatever part of the house they are, they may be perceptible on the furniture, with the colour of which they would frequently be confounded.

But though the colours of those animals, be taken, as well as those of most quadrupeds, from the two extreme terms of the progression of colours, that is, black and white, I do not recollect that I ever saw a dog completely white, or completely black. White dogs always have some spots on their skins, were it but the tip of the snout, of a dark colour. Such as are black or brown, have streaks of white, or fire coloured specks; so that wherever they are, you can easily perceive them. I have farther remarked in them this instinct, especially in dogs of a dusky colour; when they want to lie down, they always resort to a white coloured ground, in preference to one of any other colour. The Ladies well know this to be the case; for if there happens to be a little dog, of a dark hue, in an apartment where company is assembled, he hardly ever fails to go to repose at a Lady's foot, and on her petticoats.

The instinct, which prompts the dog to retire to rest on white stuffs, arises from the feeling which he himself has of the contrast affected by the fleas, by which he is frequently tormented. Fleas, in whatever place, resort to white coloured objects. If you enter into a room, where there are many of those insects, if you happen to wear white stockings, these will instantly attract them. They will even crowd to a single sheet of white paper. And this is the reason why light coloured dogs are much more infested by them than others. I have likewise observed, that wherever there are dogs of a white colour, the black and the brown always pay court to them, and give them a decided preference as play mates, undoubtedly to get rid of the fleas at their expense. In saying this, however, I do not mean to throw an imputation of treachery on their professions of friendship. Were it not for the instinct of these minute, black, nimble, nocturnal insects, toward the white colour, it would be impossible to perceive, and to catch them.

The common deep coloured fly resorts, in like manner, to white and brilliant objects; and this accounts for the tarnishing of every thing glossy and gilded in our apartments. The flesh fly delights, on the contrary, to settle on the livid colours of meat in a state of putridity. His blue corsalet makes him easily discernible on that ground.

order, of beauty and of pleasure, which spring up in the mind, at the sight of her Works ; and from their absence arise the uneasy feelings of disorder, ugliness, languor, and disgust. They extend equally to all the kingdoms ; and though I have limited myself, in the sequel of this Work, to an examination of their effects in the vegetable kingdom only, it is impossible for me, however, to deny myself the pleasure of indicating them, at least, in the human figure. It is here that Nature has combined all the harmonic expressions in their highest degree of excellency. All I can do is to trace a feeble sketch of it. To acknowl-

If we extend these contrasts farther, we shall find that, not only all sanguinivorous insects have the instinct of opposing their colours to those of the situations in which they live, but all carnivorous animals likewise ; whereas all feeble, gentle and innoxious animals, as we have seen, are furnished with means and instincts of consonance with the ground on which they are made to inhabit. Thus has Nature willed it should be, in order that the first might be perceived by their enemies, and that the second might be enabled to escape them.

From those natural Laws might be deduced a multitude of useful and agreeable consequences, tending to the improvement of our habitations, in respect of cleanliness and conveniency. For example, in order the more readily to destroy the insects which disturb our sleep, and which are so common in Paris, it would be proper to have the alcoves, the staining, the drapery, the wooden frame of our beds, of white or faint colours ; on which insects might be easily perceived.

As to conveniency, every one must be sensible how necessary it is that the colours of different pieces of furniture should form a contrast, for the purpose of being distinguished with facility. I am frequently at a loss, for instance, to know what is become of my snuff box, because it is black, like the table on which I put it down. If Nature had not been possessed of more intelligence than I am, the greatest part of her Works would utterly disappear. It is very astonishing that Philosophers, who have pursued so many curious researches respecting the nature of colours, should never have suggested a syllable respecting their contrasts, without which nothing would be distinguishable ; or rather, their forgetfulness is not surprising : Man is incessantly pursuing the illusion which escapes him, and neglects the useful truth which is lying at his foot.

The harmonies of colours have, besides, a mighty influence upon the passions : But I must not presume to say any thing with regard to this, in a Country where the Women employ them with such unbounded sway. To the Women I stand indebted for the first idea I had of studying the elements of the Laws, by which Nature herself strives to communicate pleasure to us.

edge the truth, this is not precisely the proper place, neither have I leisure to arrange more than a part of the observations which I have collected, on this vast and interesting subject. But the little, which I am going to advance, will be sufficient to overturn the position maintained by men of but too high celebrity in the World of Science, namely, That human Beauty is arbitrary.

I will even go so far as to flatter myself with the hope, that these rude Essays may induce wise men, who love Nature, and who wish to be acquainted with her Laws; to dig into the recesses of this vast mountain of hidden treasure, in which Truth lies buried. Their multiplied illumination will conduct them, without difficulty, through the whole extent of that invaluable mine, of which, groping like a blind man, I have traced only the first superficial furrows. They will be led on from one rich vein of precious ore, to another still richer, since even I, if I may presume to say so, have been able, at the bottom of a valley, and on the sandy bed of a little rivulet, to pick up a few straggling grains of gold.

OF THE HUMAN FIGURE.

All the harmonic expressions are combined in the Human Figure. In treating this article, I shall confine myself to the examination of some of those which compose the head of Man. Observe, its form is an approximation to the spherical, which, as we have seen, is *the* form, by way of excellence. I do not believe that this configuration is common to it with that of any animal whatever. On its anterior part is traced the oval of the face, terminated by the triangle of the nose, and encompassed by the radiations of the hair. The head is, besides, supported by a neck of considerably less diameter than itself, which detaches it from the body by a concave part.

This slight sketch presents to us, at first glance, the five harmonic terms of the elementary generation of forms. The hair exhibits lines ; the nose the triangle ; the head the sphere ; the face the oval ; and the void under the chin the parabola. The neck which, like a column, sustains the head, exhibits, likewise, the very agreeable harmonic form of the cylinder, composed of the circular and quadrilateral.

These forms, however, are not traced in a stiff and geometrical manner, but imperceptibly run into each other, and mutually blend, as the parts of the same whole ought to do. Thus the hair does not fall in straight lines, but, in flowing ringlets, harmonizes with the oval of the face. The triangle of the nose is neither acute, nor does it present a right angle ; but, by the undulatory swelling of the nostrils, presents a harmony with the heart form of the mouth, and, sloping toward the forehead, melts away into the cavities of the eyes. The spheroid of the head, in like manner, amalgamates with the oval of the face. The same thing holds with respect to the other parts, as Nature employs, in their general combination, the roundings of the forehead, of the cheeks, of the chin, of the neck, that is, portions of the most beautiful of harmonic expressions, which is the sphere.

There are, farther, several remarkable proportions which form, with each other, very pleasing harmonies and contrasts : Such is that of the forehead, which presents a quadrilateral form, in opposition to the triangle, compounded of the eyes and the mouth ; and that of the ears, formed of very ingenious acoustic curves, such as are not to be met with in the auditory organ of animals, because, in the case of mere animals, it is not intended to collect, like that of Man, all the modulations of speech.

But I must be permitted to expatiate, somewhat more at large, on the charming forms, assigned by Nature to the eyes and the mouth, which she has placed in the full blaze of evidence, because they are the two active organs of the

foul. The mouth consists of two lips, of which the upper is moulded into the shape of a heart, that form so lovely, as to have become proverbial for its beauty ; and the under is rounded into a demicylindric segment. In the opening between the lips, we have a glimpse of the quadrilateral figure of the teeth, whose perpendicular and parallel lines contrast most agreeably with the round forms adjoining, and so much the more, as we have seen, that the first generative term being brought into union with the supremely excellent harmonic term, that is, the straight line with the spherical form, the most harmonic of all contrasts results from it.

The same relations are to be found in the eyes, the forms of which combine still more the harmonic elementary expressions ; as it was fit the chief of all the organs should do. They are two globes, fringed on the lids with eyelashes, radiating with divergent pencil strokes, which form with them a most delightful contrast, and present a striking consonance with the Sun, after which they seem to have been modelled, having, like that orb, a spherical figure, encircled with divergent rays, in the eyelashes ; having a movement of self rotation, and possessing the power, like him, of veiling themselves in clouds, by means of their lids.*

The same elementary harmonies may be traced in the colours of the head, as well as in its forms ; for we have in the face, the pure white exhibited in the teeth and in the eyes ; then the shades of yellow, which dissolve into its carnation, as the Painters well know ; after that the red, the eminently excellent colour, which glows on the lips and on the cheeks. You farther remark the blue of the veins, and sometimes that of the eyeballs ; and finally, the black of the hair which, by its opposition, gives relief to the colours of the face, as the vacuum of the neck detaches the forms of the head.

You will please to observe, that Nature employs not, in decorating the human face, colours harshly opposed ;

but blends them, as she does the forms, softly and insensibly into each other. Thus, the white melts here into the yellow, and there into the red. The blue of the veins has a greenish cast. The hair is rarely of a jet black; but brown chestnut, flaxen, and, in general, of a colour, into which a slight tint of the carnation enters, in order to prevent a violently harsh opposition. You will farther observe, that as she employs spherical segments in forming the muscles which unite the organs, and in order particularly to distinguish these very organs, she makes use of red for the same purposes. She has, accordingly, extended a slight shade of it to the forehead, which she has strengthened upon the cheeks, and which she has applied pure and unmixed to the mouth, that organ of the heart where it forms a most agreeable contrast with the whiteness of the teeth. The union of this colour, with that harmonic form, is the most powerful consonance of beauty; and it is worthy of remark, that wherever the spherical forms swell, there the red colour strengthens, except in the eyes.

As the eyes are the principal organs of the soul, they are destined to express all its emotions; which could not have been done with the harmonic red tint, for this would have given but one single expression. Nature, in order there to express the contrary passions, has united in the eye the two most opposite of colours, the white of the orbit and the black of the iris, and sometimes of the ball, which form a very harsh opposition, when the globes of the eyes are displayed in the full extent of their diameter; but by means of the eyelids, which Man can contract, or dilate, at pleasure, he is enabled to give them the expression of all the passions, from love to fury.

Those eyes whose balls are blue are naturally the softest, because the opposition, in this case, is less harsh with the adjacent white; but they are the most terrible of all when animated with rage, and this from a moral contrast, which constrains us to consider those as the most formi-

dable of all objects, that menace evil, after having encouraged us to expect good. Persons, therefore, who are thus distinguished, ought to be carefully on their guard against treachery to that character of benevolence bestowed on them by Nature; for blue eyes express, by their colour, something enchantingly celestial.

As to the movements of the muscles of the face, it would be extremely difficult to describe them, though I am fully persuaded it might be possible to explain their Laws. Whoever shall attempt this, must of necessity refer them to the moral affections. Those of joy are horizontal, as if the soul, in the enjoyment of felicity, had a disposition to extend itself. Those of chagrin are perpendicular, as if, under the pressure of calamity, the mind was looking toward Heaven for refuge, or seeking it in the bosom of the earth. Into such an explanation of the Laws of muscular motion must likewise enter, the alterations of colours, and the contractions of forms, and in these, at least, we shall discover the truth of the principle which we have laid down, that the expression of pleasure is in the harmony of contraries, blending with each other in colours, forms, and motions; and that the expression of pain consists in the violence of their oppositions. The eyes alone have motions ineffable; and it is remarkable, that, under the influence of very strong emotions, they are suffused with tears, and thus seem to have a farther analogy with the orb of day, who, in the season of tempests, shrouds himself in rainy distillations.

The principal organs of sense, four of which are placed in the head, have particular contrasts, which detach their spherical forms, by means of radiated forms; and their shining colours by means of dusky tints. Thus the bright organ of vision is contrasted by the eyebrows; those of smell and taste, by the mustaches; the organ of hearing, by that part of the hair called the *favourite* lock, which separates the ear from the face; and the face itself

is distinguished from the rest of the head, by the beard, and by the hair.

We shall not here examine the other proportions of the human figure in the cylindric form of the neck, opposed to the spheroid of the head, and to the plane surface of the breast; the hemispherical forms of the paps, which contrast with the flatness of the chest; as well as the cylindrical pyramids of the arms and fingers with the omoplate of the shoulders; the consonances of the fingers with the arms, by means of three similar articulations, with a multitude of other curvatures, and of other harmonies, which, hitherto, have not so much as a name in any language, though they are, in every country, the all powerful expression of beauty.

The human body is the only one which unites, in itself, the modulations, and the concerts, inexpressibly agreeable, of the five elementary forms, and of the five primordial colours, without exhibiting any thing of the harsh and rude oppositions perceptible in the brute creation, such as the prickles of the hedge hog, the horns of the bull, the tusks of the wild boar, the fangs of the lion, the marbled skin of the dog, and the livid and disgusting colours of venomous animals. It is the only one of which the first touch, is perceptible, and which you can see completely; other animals being disguised under hair, or feathers, or scales, which conceal their limbs, their shape, their skin. Farther, it is the only form which, in its perpendicular attitude, displays all its positions and directions at once; for you can hardly perceive more of a quadruped, of a bird, of a fish, than one half, in the horizontal position which is proper to them, because the upper part of their body conceals the under.

We must, likewise, remark, that Man's progressive motion is subject to neither the shocks, nor the tardiness of movement of most quadrupeds, nor to the rapidity of that of birds; but is the result of movements the most har-

monic, as his figure is, of forms, and of colours, the most delightful.*

* It has been maintained by certain celebrated Authors, that the Negroes consider their own colour as more beautiful than that of the whites ; but it is a mistake. I have put many a question, on this subject, to black people, who were in my own service, in the Isle of France, and who were at perfect liberty to tell what they really thought, especially on a subject so indifferent to slaves, as the beauty of the whites. I sometimes asked them whether of the two they would prefer, a black wife, or a white ? They never hesitated an instant in declaring their preference of the white woman. Nay, I have seen a Negro, who had been almost dead alive by the whip, in one of our plantations, express the highest delight when the scars of his sores began to whiten, because it suggested the hope, that he was thereby going to change colour, and to be negro no longer. The poor wretch would gladly have parted with his whole hide to become white. This preference, we shall be told, is, in that case, the effect of the superiority which they are obliged to ascribe to the Europeans. But the tyranny of their masters ought rather to inspire abhorrence of the colour. Besides, the black men and women, of our colonies, express the same tastes that our peasantry at home do, for stuffs of lively and glaring colours. Their supreme luxury in dress is a red handkerchief tied round their head. Nature has bestowed no other tints on the roses of Africa than upon those of Europe.

If the judgment of black slaves is considered as a suspicious authority on the subject, we may refer the decision to the taste of the Sovereigns of Africa, who are under no temptation to dissemble. They fairly acknowledge that in this, as well as in many other respects, they have been more hardly dealt with than the Europeans. African Princes have made frequent application to the Governors of the English, Dutch and French settlements on the coast, for white women, under a promise of very ample privileges in return. *Lamb*, an English agent at Ardra, when prisoner to the King of Dahomay, in the year 1724, sent word to the Governor of the English fort at Juida, that if he could send a white woman, or even a mulatto, to this Prince, she might acquire an unbounded influence over his mind. (*General History of Voyages, by the Abbé Prevost. Book viii. page 96.*)

Another King, on a different part of the coast of Africa, promised, one day, to a Capuchin missionary, who was preaching the Gospel in his presence, to dismiss his seraglio, and embrace Christianity, if he would procure him a white woman to wife. The zealous missionary immediately repaired to the nearest Portuguese settlement ; and having enquired, whether there might not be among them some poor and virtuous damsel, such as might suit his purpose, he was informed of such a person, the niece of a very poor man of family, who lived in a state of great privacy. He waited for her one Sunday morning, at the door of the church, as she was returning from mass with her kinsman ; and addressing himself to the uncle,

The more that the multiplied consonances of the human figure are agreeable, the more disgusting are its dissonances. This is the reason that, on the face of the

before all the people, charged him, in the name of God, and as he valued the interests of religion, that he would bestow his niece in marriage on the Negro King. The gentleman and his niece having given their consent, the black Prince married her, after having dismissed all his other women, and received public baptism. (*History of Ethiopia, by Labat.*)

The best informed travellers relate many such anecdotes, of a similar preference expressed by the black Sovereigns of Africa, and of southern Asia. *Thomas Rowe*, Ambassador from England at the Court of the Mogul *Selim Scha*, relates, that a very cordial reception was given, by this powerful Monarch, to certain Portuguese Jesuits, who had come as missionaries into his dominions, with a view to obtain, through their means, some women of their country to recruit his seraglio. He began with conferring on them singular privileges; had apartments provided for them in the vicinity of his palace, and admitted them to his most intimate familiarity: But perceiving that those good fathers discovered no great inclination to gratify his desires, he practised a very ingenious artifice to draw them into compliance. He expressed an extreme partiality to the Christian Religion; and pretending that he was restrained, merely by reasons of State, from openly embracing it, he gave strict orders to two of his nephews to attend punctually on the catechetical instructions of the missionaries. When the young men had acquired a competent degree of knowledge, he enjoined them to get themselves baptized, and, this being complied with, he thus addressed them: "It is now no longer in your power to marry pagan women, and of this country; for you have made profession of Christianity. It is the duty of the fathers, who baptized you, to procure you wives. Tell them they must send to Portugal for women to be your brides." The young proselytes did not fail to make this demand on the good fathers; who, suspecting that the Mogul's real intention, in marrying his nephews to Portuguese wives, was to procure a supply of white women for his seraglio, refused to engage in this negociation. Their refusal highly incensed *Selim Scha*, and exposed them to much persecution: He immediately commanded his nephews to renounce Christianity. (*Memoirs of Thomas Rowe, Thevenot's Collection.*)

The black colour of the skin is, as we shall presently see, a blessing from Heaven to the Nations of the South, because it absorbs the reflexes of the burning Sun under which they live. But the men of those Nations do not the less, on that account, consider white women as more beautiful than the black, for the same reason that they think the day more beautiful than the night, because the harmonies of colours and of lights render themselves perceptible in the complexion of the whites, whereas they almost entirely disappear in that of the blacks, who can pretend to no competition with the others, in point of beauty, except as to form and stature.

Earth, there is nothing so beautiful as a handsome man, nor so shocking as a very ugly one.

This farther suggests a reason why it will be forever impossible for art to produce a perfect imitation of the human figure, from the difficulty of uniting in it all the harmonies, and from the still greater difficulty of effecting a complete combination of those which are of a different nature. For example, the Painter may succeed tolerably in imitating the colours of the face, and the Sculptor in expressing its forms. But were an attempt made to unite the harmony of colours and of forms in a single bust, such a production will be very inferior to a mere picture, or to a mere piece of sculpture, because it will combine particular dissonances of colours and of forms, besides their general dissonance, which is still more marked. If to these it were farther attempted to add the harmony of movements, as in the case of an automaton, this would aggravate the incongruity. Were art to continue its effort, and try to bestow the gift of speech likewise, this must produce a fourth dissonance, which would be absolutely hideous ; for here the intellectual system would clash frightfully with the physical system. It is, accordingly, matter of no surprise to me, that *St. Thomas Aquinas* was so shocked at the speaking head, in constructing which, his master, *Albert the Great*, had employed so many years, that under the influence of horror, he instantly broke it to shivers. It must have produced on him the same impression which he would have felt, had he heard an articulate voice issuing out of a dead man's

The proportions of the human figure, having been taken, as we have just seen, from the most beautiful forms of Nature, are become, in their turn, models of beauty for Man. If we attend to this, we shall find, that the forms which please us most in works of art, as those of antique vases, and the relations of height and breadth in monuments have been taken from the human figure. It is well known that the Ionic column, with its capital and its flutings, was imitated after the shape, the head dress, and the drapery of the Grecian young women.

mouth. Such labours, in general, do the Artist much honour ; but they demonstrate the weakness of art, which falls below Nature just in proportion as it aims at uniting more of her harmonies. Instead of blending them, as Nature herself does, art can only place them in opposition.

All this proves the truth of the principle which we have laid down, namely, that harmony results from the union of two contraries, and discord from their collision : And the more agreeable that the harmonies of an object are, the more disgusting are its discordances. This is the real origin of pleasure and of dislike, in physics as in morals, and the reason why the same object so frequently excites affection and aversion.

A great variety of very interesting reflections remain to be made on the human figure, especially by connecting with it the moral sensations, which alone give expression to the features. We shall introduce some of these in the sequel of this Work, when we come to speak of sentiment. Be it as it may, the physical beauty of Man is so striking, in the eyes even of the animal creation, that to it, principally, must be ascribed the empire which he exercises over them, in every part of the Earth. The feeble flee for refuge under his protection, and the most powerful tremble at sight of him. *Mathiola* relates, that the lark will save herself amidst troops of men, when she perceives the bird of prey hovering over her. The reality of this instinct was confirmed to me by an officer, who was once an eye witness of one, in such circumstances, fleeing for safety among a very distinguished squadron of cavalry, in which he then served ; but the trooper whose particular protection she sought, trampled her to death under his horse's feet ; a most barbarous action, which drew on him, and justly, the indignation of every good man in the corps.

I myself have seen a stag, when run down by the hounds, appeal, with sobs, for relief, to the compassion of persons accidentally passing that way. *Pliny* relates a

Similar fact, and it is consistent with my own experience, when I was in the Isle of France, which I have detailed in the journal of my voyage to that Island. I have seen, in the farm yards, the India hens, under the impulse of love, go and throw themselves chuckling at the feet of the country people. If we meet less frequently with instances of the effect of animal confidence in Man, it is because of the noise of our fowling pieces, scaring them incessantly, and of the continual other persecutions which they are doomed to undergo.

It is well known with what familiarity the monkeys, and fowls of all kinds, approach travellers in the forests of India.* I have seen at the Cape of Good Hope, in Cape town itself, the shores of the Sea swarming with water fowls, which perched confidently on the shallops, and a large wild pelican playing close by the custom house, with a great dog, whose head she took into her enormous beak. This spectacle conveyed to me, from the moment of my arrival, a most powerful impression in favour of the happiness of that country, and of the humanity of its inhabitants : Nor did my conjecture deceive me.

But dangerous animals, on the contrary, are seized with terror at the sight of Man, unless they be driven from their natural bias by some pressing necessity. An elephant will suffer himself to be led about, in Asia, by a little child. The African lion retires, growling, from the cabin of the Hottentot ; surrenders up to him the possessions of his ancestors, and seeks for himself a kingdom far remote, in forests, and among rocks, untrodden by the foot of Man. The immense whale, amidst his native element, trembles, and flees away before the puny bark of the Laplander. And thus, to this day, is executed that all potent Law, which secured empire to Man, though sunk into guilt and wretchedness : “ And the fear of you, and the dread of you, shall be upon every beast of the earth;

* See *Bernier and Mandslu*.

“ and upon every fowl of the air ; ‘upon all that moveth
 “ upon the earth, and upon all the fishes of the sea ; into
 “ your hand are they delivered.*”

It is singularly remarkable, that, through the whole extent of Nature, there is no animal whatever, nor plant, nor fossil, nor even globe, but what has its consonance and its contrast out of itself, Man excepted. No one visible being enters into society with him, but either as his servant or as his slave.

We must, undoubtedly, reckon, among the human proportions, that Law so universal, and so wonderful, which produces males and females in equal numbers. Did chance preside over the generation of the human race, as over our alliances, we should one year have an unmixed crop of male children, and another, a race entirely female. Some nations would consist wholly of men, and others, wholly of women ; but all over the Globe, the two sexes are born, within the same space of time, equal in number. A consonance so regular, clearly demonstrates, that a Providence is continually watching over the affairs of Mankind, notwithstanding the absurdity and disorder of human institutions. This may be considered as a standing testimony to the truth of our Religion, which, likewise, limits Man to one Woman in marriage, and by this conformity to natural Laws, peculiar to itself, seems alone to have emanated from the AUTHOR of Nature. It may fairly be concluded, on the contrary, that a religion, which permits, or connives at, a plurality of wives, must be erroneous.

Ah ! how little acquainted are they with the Laws of Nature, who, in the union of the two sexes, look for nothing farther than the pleasures of sense ! They are only culling the flowers of life, without once tasting of its fruit. The fair sex ! this is the phrase of our men of pleasure ; women are known to them under no other

* Genesis, chap. ix. ver. 2.

idea. But the sex is fair only to persons who have no other faculty except that of eyesight. Besides this it is, to those who have a heart, the creative sex which, at the peril of life, carries Man, for nine months, in the womb ; and the cherishing sex, which suckles and tends him in infancy. It is the pious sex which conducts him to the altar while he is yet a child, and teaches him to draw in, with the milk of her breast, the love of a religion which the cruel policy of men would frequently render odious to him. It is the pacific sex, which sheds not the blood of a fellow creature ; the sympathizing sex, which ministers to the sick, and handles without hurting them.

To no purpose does Man pretend to boast of his power and his strength ; if his robust hands are able to subdue iron and brass, those of the woman, more dextrous, and more usefully employed, can spin into threads the flax and the fleeces of the sheep. The one encounters gloomy care with the maxims of philosophy ; the other banishes it by sportiveness and gaiety. The one opposes to external evils the force of his reason ; the other, far happier, eludes them by the mobility of her's. If the man sometimes considers it as his glory to bid defiance to danger in the field of battle, the woman triumphs, in calmly meeting dangers more inevitable, and frequently more cruel, on her bed, and under the banners of pleasure. Thus, they have been created to support together the ills of life, and to form, by their union, the most powerful of consonances, and the sweetest of contrasts.

I am obliged, by the plan of my Work, to proceed forward, and to refrain from pursuing my reflections on subjects so interesting as the marriage, and the beauty, of Man and Woman. I must, however, hazard some farther observations, extracted from my store, in order to induce others to dive into this rich mine, with the additional value of novelty.

All Philosophers who have made Man their particular study, are agreed, and with good reason, that he is the

most wretched of all animals. Most of them appear to have been sensible, that an associate was necessary to him, to relieve his burthens, and they have made his happiness, in part, to consist of friendship ; which is an evident demonstration of human weakness and misery ; for were Man naturally strong, he would stand in no need of either associate or assistance. Elephants and lions live solitary in the forests. They need no friends, because Nature has made them strong.

It is very remarkable that, when the Ancients give us a representation of perfect friendship, it is always restricted to two, and no more, whatever may be the extent of human weakness ; for Man is frequently reduced to the necessity of deriving his felicity from the concurring interposition of many beings similar to himself. Several reasons may be assigned for this restriction; the principal of which are deducible from the nature of the human heart, which, from its very weakness, is capable of attaching itself to only one object at once ; and which, being compounded of opposite passions, that maintain a perpetual counterpoise, is, in some sense, both active and passive, and stands in need of loving and of being beloved, of comforting and of being comforted, of honouring and of being honoured, and so on. Accordingly, all the friendships celebrated in the historic page, existed only between two persons ; such as those of *Castor and Pollux* ; of *Theseus and Perithous* ; of *Hercules and Iolas* ; of *Orestes and Pylades* ; of *Alexander and Hephestion*, and many others.

It is farther to be remarked, that those singular friendships have ever been associated with virtuous and heroic actions ; but whenever the union comprehended more persons than two, it was speedily dissolved by discord, or, if permitted to subsist for any length of time, became famous only for the mischief which it brought on Mankind : Such was that of the triumvirate among the Romans. In cases when the associates, in such alliances, were still more numerous, the mischief which they did

was always in proportion to the greatness of the number of which they consisted. Thus, the tyranny of the Decemviri at Rome exhibited a violence still more cruel than that of the Triumviri, for it spread destruction, we may venture to say, without passion, and in cold blood.

There are, likewise, triummillvirates, and decemmillvirates: These are your various descriptions of Corps. With good reason have they obtained the appellation of *Corps*; for they frequently have a centre distinct from their Country, of which they ought only to be members. They have, likewise, views distinct from those of their Country, a distinct ambition, and distinct interests. They are, with relation to the rest of the citizens, inconstant, detached, destitute of an object, and frequently destitute also, of the spirit of patriotism: That, in a word, which regular troops are with relation to light troops. They will not suffer them to appear in an avenue along which they themselves are advancing, and dispossess them of the posts which they may have occupied, the whole length of their route. How many revolutions have been effected in Russia by the Strelitzes; in Rome, by the Pretorian guards; at Constantinople, by the Janizaries; and elsewhere, by Corps still more political! Thus, by a just reaction of Providence, the spirit of Corps has been as fatal to countries, as the spirit of Country has itself been to Mankind.

If the heart of Man admits of but a single object, What judgment shall we form of our modern friendships, embracing, as they do, such a multiplicity? Undoubtedly, if a man has thirty friends, he can bestow on each of them only the thirtieth part of his affection, and can receive, in return, no greater proportion of theirs. He must of necessity, therefore, deceive them, and be deceived by them; for no one is disposed to be a friend by fractions.

But, if the truth may be told, such friendships are merely confederacies of ambition; relations interested and purely political, employed entirely in practising mutual

illusion, in the view of aggrandizing themselves at the expense of Society ; and which would be productive of unspeakable mischief, were they more clearly united among themselves, and unless they were counterbalanced by opposite confederacies. Almost all our general affociations, accordingly, issue in intestine wars. On the other hand, I do not speak of the inconveniencies which result from particular unions, rather too intimate. The most celebrated friendships of Antiquity have not been, in this respect, wholly exempt from suspicion, though, I am persuaded, they were as virtuous as the persons who were the objects of them.

The AUTHOR of Nature has given to each of us, in our own species, a natural friend, completely adapted to all the demands of human life, capable of supplying all the affections of the heart, and all the restlessness of temperament. He says, from the beginning of the World : “ It is not good that the man should be alone : I will “ make him an help meet for him ;—and the LORD GOD “ made Woman, and brought her unto the Man.*” Woman pleases all our senses by her form and by her graces. She has, in her character, every thing that can interest the heart of Man, and at every stage of human life. She merits, by the long and painful sollicitudes which she exercises over our infancy, our respect as a mother, and our gratitude as a nurse ; afterward, as Man advances to youth, she attracts all his love as a mistress ; and in the maturity of manhood, all his tenderness as a wife, his confidence as a faithful steward, his protection, as being feeble ; and, even in old age, she merits our highest consideration, as the source of posterity, and our intimacy, as a friend who has been the companion of our good and bad fortune through life. Her gaiety, nay, her very caprices, balance, at all seasons, the gravity, and the over reflective constancy

* Genesis, chap. ii. ver. 18, 22.

of Man, and acquire, reciprocally, a preponderancy over him.

Thus, the defects of the one sex, and the excess of the other, are an exact mutual compensation. They are formed, if I may use the expression, to be grooved into each other, like the corresponding pieces of carpenters' work, the prominent and retreating parts of which constitute a vessel, fit to launch on the stormy ocean of life, and to attain additional strength from the very buffetings of the tempest. Had we not been informed by a Sacred Tradition, that Woman was extracted from the side of Man; and though this great truth were not every day manifested, in the wonderful birth of the children of the two sexes, in equal numbers, we should be speedily instructed in it by our wants. Man without the Woman, and Woman without the Man, are imperfect beings, in the order of Nature. But, the greater contrast there is in their characters, the more complete union there is in their harmonies. It is, as we have already briefly hinted, from their oppositions in talents, in tastes, in fortunes, that the most intense and the most durable affection is produced. Marriage is, therefore, the friendship of Nature, and the only real union which is not exposed, like those which exist among men, to estrangement, to rivalry, to jealousies, and to the changes which time is effecting in our inclinations.

But, Wherefore are there so few happy marriages among us? I answer, Because with us the sexes have divested themselves each of its proper nature, and assumed the other. It is because the women, with us, adopt the manners of men, from education; and men the manners of women, from habit. The women have been despoiled of the graces, and of the talents, peculiar to their sex, by the masters, the sciences, the customs, the occupations of men. There is no way left, save one, but that is infallible, to bring both back to Nature; it is to inspire them with a taste for Religion. By Religion, I do not mean attach-

ment to ceremonies, nor systems of Theology ; but the religion of the heart, pure, simple, unostentatious ; such as it is so beautifully depicted in the Gospel.

Religion will restore to the two sexes, not only their moral character, but their physical beauty. It is not climate, it is not aliment, it is not bodily exercise, nor all these together, which form human beauty ; it is the moral sentiment of virtue, which cannot subsist independently of Religion. Aliment and exercise, no doubt, contribute greatly to the magnitude and the expansion of the body ; but they have no manner of influence on the beauty of the face, which is the true physiognomy of the soul. It is by no means uncommon to see persons tall and robust disgustingly ugly ; with the stature of a giant, and the face of a monkey.

Beauty of face is to such a degree the expression of the harmonies of the soul, that, in every country, those classes of citizens who are, from their condition, obliged to live with others in a state of constraint, are sensibly the homeliest of the society. The truth of this observation may be ascertained, particularly among the noblesse of many of our provinces, who live with each other in the perpetual jealousy of rank, and with their neighbours of an inferior order, in a state of unremitting hostility, for the maintenance of their prerogatives. Most of those Nobles present a complexion bilious and parched. They are meagre, sulky, and perceptibly uglier than the other inhabitants of the same district, though they breathe the same air, live on the same aliments, and, in general, enjoy a superior degree of fortune. Accordingly, they are far from being gentlemen both in name and in fact. Nay, there is a Nation bordering upon ours, the subjects of which are as much celebrated all over Europe, for their pride as for their homeliness. All those men are rendered hard favoured from the same causes that most of our children degenerate in look ; who, however amiable in early life, become ugly on going to college, from the miseries and

irkfomeness of their institutions. I say nothing of their natural character, which undergoes the same revolution with their physiognomy; this last being always a consequence of the other.

The same thing does not hold good respecting the noblesse of some other of our provincial districts, and the nobility of other parts of Europe. These, living, as they do, in good understanding among themselves, and with their compatriots, are, in general, the handsomest men of their Nation, because their social and benevolent spirit is not in a state of incessant constraint and anxiety.

To the same moral causes may be referred the beauty of the features of the Greek and Roman physiognomies, where we generally meet with models so exquisite, in their statues and medallions. They were beautiful, because they were happy; they lived in cordial union with their equals, and in the enjoyment of popular favour with the citizens at large. Besides, there were among them no melancholy, moping, monkish institutions, similar to those of our colleges, to disfigure the whole youth of a Nation at once. The descendants of those same Nations are, at this day, far from exhibiting a resemblance to their ancestors, though the climate of their country is not in the smallest degree changed.

It is, farther, to moral causes that we must refer the singularly dignified physiognomies of the great Lords of the Court of *Louis XIV*, as is visible in their portraits. In general, persons of quality being, by their rank, elevated above the rest of the Nation, do not live continually at daggers drawing with each other, and with the other subjects of the State, as is the case of most of our small country gentlemen. Besides, they are usually educated under the paternal roof, that is, under the blessed influence of domestic enjoyment, and far remote from foreign jealousy and strife. But those of the age of *Louis XIV*, had this distinguished advantage over their posterity, that they were taught to value themselves on beneficence, and popular

affability, and on bestowing their patronage upon talents and virtue, wherever they found them. There is not, perhaps, a great Family of that period, but what has the honour to boast of having brought forward, and raised into distinction, some one man of obscure birth, or of the inferior nobility, who afterwards rendered himself illustrious, by means of such support, in arts, in literature, in the church, or in the army.

These grandees acted thus, in imitation of the Sovereign, or, perhaps, from a remainder of the spirit of the magnificence of the feudal government, which then expired. Be this as it may, they were handsome, because they were contented and happy ; and this noble emotion of soul toward beneficence, has impressed on their physiognomy a majestic character, which will ever distinguish them from the men of preceding ages, and still more from that which has succeeded.

Observations of this kind are not an object of curiosity merely ; they are of much more importance than is generally apprehended ; for it follows, as a necessary consequence, that, in order to form in a Nation beautiful children, and, of course, handsome men, in both the physical and moral sense of the word, it is not necessary, according to the doctrine of certain medical men, to subject the human species to regular purgations, and under particular aspects of the Moon. Children restricted to a rigid regimen of this sort, as are most of those of our Physicians and Apothecaries, all present wan pasteboard figures ; and when grown up, pale complexions, and bilious temperaments, like their fathers.

In order to render children beautiful, you must render them physically, but above all, morally happy. You must prevent every possible occasion of vexation to them, not by kindling in their breasts dangerous and headstrong passions, as in the case of spoiled children, but, on the contrary, by teaching them to curb such as they have from Nature, and which society is ever exciting into a

state of fermentation ; and especially, by carefully guarding against the communication of every thing unnatural, such as useless and irksome tasks, emulations, rivalships, and the like.....But we shall resume this important subject, at greater length, hereafter.

The ugliness of a child is to be imputed, in almost every case, to his nurse, or to his preceptor. I have sometimes observed, among so many classes of society, more or less disfigured by our institutions, some families singularly beautiful. On enquiring into the cause of this, I have found that those families, though of the commonalty, were happier, in a moral respect, than those of other citizens ; that the mothers had suckled their own children ; that the young people had learned their occupations under the paternal roof and inspection ; that they had been treated with much tenderness and indulgence ; that their parents were fondly attached to each other ; and that they all lived together, notwithstanding the hardships of their low condition, in a state of liberty and cordiality, which rendered them good, happy and satisfied.

I have thence deduced this other consequence: That we frequently make a false estimate of the happiness of human life. On seeing here a Gardener, with the port of a Roman Emperor ; and there a great Lord, with the mask of a slave, I imagined, at first, that Nature had committed a mistake. But experience demonstrates, that the great Lord in question is, from the hour of his birth to that of his death, placed in a series of positions, which permit him not to gratify his own inclination three times a year. For he is under the necessity, from his infancy upward, to do the will, first of his preceptors and masters ; in more advanced life, that of his prince, of ministers of state, of his rivals, nay, frequently, that of his enemies. Thus, he finds fetters innumerable in his very dignities. Our Gardener, on the other hand, passes his whole life without being exposed to the slightest contradiction. Like the Centurion, in the Gospel, he says to his servant.

Come, and he cometh; and to another, Do this, and he doeth it. This demonstrates, that Providence has assigned to our very passions a part widely different from that which society presents to them; for, in cases innumerable, the most unrelenting slavery is imposed, together with an accumulation of honours; and, in the meanest of human conditions, we frequently find the possession of the most unbounded empire.

Besides, persons who have been disfigured, by the corruptive impression of vicious education and habits, have it in their power to reform their looks; and I say this, principally, for the sake of our females, who, in order to gain this point, apply white and red, and patch up faces, like those of dolls, utterly destitute of character. After all, they are in the right; for it is much better to conceal character altogether, than to exhibit that of the cruel passions which are often preying upon them; especially to the eyes of so many of the other sex, who study character, merely to take the advantage of it. There are infallible means in their power of acquiring a beauty altogether irresistible. It is to be internally good, gentle, compassionate, sensible, beneficent and devout. These affections of a virtuous soul will impress on their features characters altogether celestial, which will appear beautiful, even to the farthest extremity of old age.

Nay, I will venture so far as to affirm, that the harsher the traits may be in homely persons, who have suffered degradation from a faulty education, the more sublime and impressive will be the contrasts produced in them by those which they acquire from habits of virtue; for, when we find goodness under an unpromising exterior, we are as agreeably surprised as at finding violets and primroses under a shrubbery of briars and thorns. Such was the sensation inspired, on a first introduction to the crabbed looking *M. de Turenne*; and such, in our days, is that which we feel at the first aspect of a certain northern Prince, as justly celebrated for his goodness, as the King,

his brother, has rendered himself by his victories. I have no doubt, that the repelling outside of these two great men, may have greatly contributed to give a peculiar prominence to the excellence of their heart. Such, too, was the beauty of *Socrates*, who, with the features of a profligate, delighted every eye, while he discoursed of virtue.

But to no purpose will a man attempt to decorate his countenance with the indications of good qualities, to which his heart is a stranger. This false beauty produces an effect still more disgusting than the most decided ugliness; for when, attracted by an apparent goodness, we actually find dishonesty and perfidy, we are seized with horror, as when we find a serpent lurking in a bed of flowers. Such is the detestable character generally ascribed to courtiers.

Moral beauty, then, is that after which we are bound to aspire, that its divine irradiations may be diffused over our features, and over our actions. To no purpose will a Prince himself make his boast of high birth, riches, credit, wit; the People, in order to know him, must look him in the face. The People form their judgment of him entirely from the physiognomy: It is, in every country, the first, and, frequently, the last letter of recommendation.

OF CONCERTS.

Concert is an order formed of several harmonies of various kinds. It differs from simple order in this, that the last is, frequently, nothing but a series of harmonies of the same species.

Every particular Work of Nature presents, in different kinds, harmonies, consonances, contrasts; and forms a real concert. This we shall more amply unfold in the Study which treats of plants. It may henceforward be

considered as a well founded remark, on the subject of those harmonies, and of those contrasts, that vegetables, whose flowers have the least lustre, are frequented by animals of the most brilliant colours; and, on the contrary, that the vegetables which are most highly coloured, serve as an asylum to the duskiest animals. This is particularly evident in countries situated between the Tropics; where the trees and herbage, which have few, if any, apparent flowers, lodge and support birds, insects, nay monkies, of the most lively colours. It is in the plains of India that the peacock displays his gaudy plumage, on shrubbery despoiled of verdure by the burning heat of the Sun. In the same climates, it is, that the parrot race, consisting of so many different species, enamelled with a thousand various colours, perch on the gray boughs of the palm tree, and that clouds of little paroquets, green as the emerald, alight on fields embrowned by the lengthened heats of Summer.

In our temperate regions, on the contrary, most of our birds are dull coloured, because most of our vegetables have flowers and fruits with shining colours. It is very remarkable, that such of our birds and insects as have lively colours usually choose, for their habitation, vegetables that have no apparent flowers. Thus, the heath cock glisters on the gray verdure of the pine, whose apples serve him for food. The goldfinch builds his nest in the rough fuller's thistle. The most beautiful of our caterpillars, which is marbled with scarlet, is to be found on a species of the tithymal, that usually grows in the sands, and amidst the quarries of the forest of Fontainebleau. On the contrary, our birds of dusky hue inhabit shrubbery with gay coloured flowers. The black headed bullfinch builds his nest in the white thorn, and that lovely bird exhibits a farther most agreeable consonance and contrast with the prickly shrub where he resides, by his blood stained breast, and the sweetness of his song. The nightingale, with brown plumage, delights to nestle in the rose bush,

according to the traditions of the oriental Poets, who have founded many a charming fable on the loves of that melancholy bird for the rose.

I could here exhibit a multitude of other harmonies, of a similar nature, respecting the animals both of our own, and of foreign countries. I have collected these to a very considerable number ; but, I acknowledge, they are too incomplete to admit of my forming of them the entire concert of one plant. I shall, however, treat the subject more at large, under the article of vegetables. It will be sufficient, at present, to produce a single example, which incontestably proves the existence of those harmonic Laws of Nature : It is this, that they subsist even in places not exposed to the view of the Sun. We always find, in the cells of the mole, fragments of the bulbous root of the colchica, close by the nest of her young. Now, let any one examine all the plants which usually grow in our meadows, and he will find none which forms more harmonies and contrasts with the black colour of the mole, than the white, impurpled, and lilach coloured flowers of the colchica. This plant, likewise, furnishes powerful means of defence to the feeble mole against her natural enemy, the dog, who is continually hunting after her in the meadows ; for he is poisoned if he eats it. For this reason, the colchica has obtained the trivial name of dogbane. The mole, then, finds a supply of food for her necessities, and a protection against her enemies, in the colchica, as the bullfinch does in the white thorn. Such harmonies are not only very agreeable objects of speculation, but may be turned to very good practical account ; for, from what has just been suggested, it will follow, that if you wish to allure the bullfinch to your shrubbery, you have only to plant the white thorn ; and if you would clear your grounds of the mole, exterminate the bulbs of the colchica.

If to each plant are added its elementary harmonies, such as those of the season when it appears ; of the soil

and situation in which it vegetates ; the effects of the dews, and of the reflexes of the light on its foliage ; the movements which it undergoes from the action of the winds ; its contrasts and consonances with other plants, and with the quadrupeds, the birds, and the insects, which are peculiar to it ; and you will perceive a delightful concert formed all around, the harmonies of which are still unknown to us. It is only, however, by pursuing this track, that we shall be enabled to obtain a glimpse of the immense and magnificent edifice of Nature. I would earnestly intreat Naturalists, persons fond of gardening, Painters, nay, Poets likewise, thus to prosecute their studies, and to make frequent draughts from this perennial spring of taste and of delight. They will behold new worlds arising into view, and, without removing from their own Horizon, they will make discoveries infinitely more curious than those which are contained in our books and cabinets, where the productions of the Universe are frittered away, and disjoined, in the petty drawers of our mechanical systems.

I know not, at present, what name I ought to give to the conformities which those particular concerts have with Man. Certain it undoubtedly is, that there is no Work of Nature but what strengthens its particular concert, or, if you will, its natural character, by the habitation of Man ; and which does not communicate, in its turn, to the habitation of Man, some expression of grandeur, of gaiety, of terror, or of majesty. There is no verdant mead but what is rendered more cheerful by a dance of shepherdesses and their swains ; and no tempest but what acquires additional horror from the shipwreck of a vessel. Nature raises the physical character of her Works to a sublime moral character, by collecting them around mankind. This is not the place to descant at large on the new order of sentiments hereby suggested. I satisfy myself, at present, with observing, that she not only

employs particular concerts to express, in detail, the characters of her Works; but when she means to express these same characters on the great scale, she combines a multitude of harmonies and of contrasts of the same kind, in order to form of them one great general concert, which has only a single expression, let the field of representation be ever so extensive.

Thus, for example, in order to express the maleficent character of a venomous plant, she combines in it clashing oppositions of the forms and colours which are the indications of that maleficence; such as retreating and bristly forms, livid colours, dark greens, with white and black spots, virulent smells....But when she means to characterize a whole district that is unwholesome, she collects a multitude of similar dissonances. The air is loaded with thick fogs, the turbid waters exhale only nauseous smells, no vegetable thrives on the putrid soil but such as are disgusting, the dracunculus, for instance, the flower of which exhibits the form, the colour, and the smell of an ulcer. If any tree arises in the cloudy atmosphere, it is the yew only, whose red and smoky trunk has the appearance of having passed through the fire, and whose gloomy foliage serves as an asylum only to owls. If any other animal is to be found seeking a retreat under its lurid shade, it is the blood coloured centipede, or the toad crawling along the humid and rotten ground. By these, or similar signs, Nature scares Man away from noxious situations.

If she intends to give him, at sea, the signal of an impending tempest; as she has opposed, in ferocious animals, the fiery glare of the eyes to the thickness of the eyebrows; the stripes and spots with which they are marked to the yellow colour of their skin, and the stillness of their movements to the thundering noise of their voices; she collects, in like manner, in the sky, and on the deep, a multitude of clashing oppositions, which, in concert, announce approaching devastation. Dark clouds sweep

through the air in the horrible forms of dragons. Here and there the pale fire of lightning bursts, from the gloom, the noise of the thunder, with which their dark womb is impregnated, resounds like the roaring of the celestial lion. The Orb of Day, who can scarcely render himself visible through their rainy and multiplied veils, emits long radiations of a wan and sickly light. The leaden surface of the Ocean sinks and swells into broad white foaming surges. A hollow murmuring noise seems to issue from those threatening billows. The black shallows whiten at a distance, with horrid sounds, from time to time, interrupted by ominous silence. The Sea, which alternately covers and reveals them, displays to the light of day their cavernous foundations. The Norwegian lorn perches on one of their craggy points, uttering lamentable cries, like those of a drowning man. The sea ospray rises aloft in the air, and not daring to commit herself to the impetuosity of the winds, struggles, with a plaintive screaming voice, against the tempest, which bends back her stubborn wings. The black procellaria flutters about, grazing the foam of the waves, and seeks, in the cavity of their moving valleys, a shelter from the fury of the winds. If this small and feeble bird happens to perceive a ship in the midst of the Sea, he flees for refuge along her side, and, as a reward for the protection which he solicits, announces the tempest to the mariner before it overtakes him.

Nature uniformly proportions the signs of destruction to the magnitude of the danger. Thus, for example, the signs of tempest off the Cape of Good Hope far exceed those on our coasts. The celebrated *Vernet*, who has exhibited so many terrifying representations of the Sea, is far from having depicted all the horrors of the watery element. Every storm has its peculiar character in every particular latitude. Far different are the storms off the Cape of Good Hope, from those off Cape Horn; those of the Baltic from those of the Mediterranean; those on the

banks of Newfoundland from those on the coast of Africa. They farther differ, according to the season of the year, and even according to the hour of the day. Those of Summer are very unlike those of Winter ; and widely different is the spectacle of an enraged sea, shining at noon day under the rays of the Sun, and that of the same sea illuminated, at the midnight hour, by a single flash of lightning. But you perceive, in all, the clashing oppositions of which I have made mention.

I have remarked one thing, in the tempests off the Cape of Good Hope, which strikingly supports all that I have hitherto advanced, respecting the principles of discord and harmony ; and which may, perhaps, suggest profound and useful reflection to some one of greater ability than I can pretend to. It is this, That Nature frequently accompanies the signs of the disorder which agitates the Ocean, with agreeable expressions of harmony, that serve only to redouble the horror of the scene.

Thus, for example, in two different storms to which I was exposed in those seas, I did not see the face of Heaven obscured by dark clouds, nor these clouds furrowed by alternate flashes of lightning, nor a sea muddy and lead coloured, as in the tempests of our climates. The sky, on the contrary, presented a fine blue, and the sea a beautiful azure ; there were no other clouds hovering in the air, but small aggregations of a ruddy vapor, dark toward the centre, and illuminated, about the extremities, with the yellow lustre of burnished brass. They took their departure from a single point in the Horizon, and travelled across the Heavens with the rapidity of a bird flying. When the thunder shivered in pieces our mainmast, in the middle of the night, it did not roll ; and emitted only a crack resembling that of a cannon, shot off close by us. Two other thunderclaps, which had preceded this one, were exactly similar. This was in the month of June, which is midwinter at the Cape of Good Hope.

I was caught in another storm, when doubling the Cape, on my return, in the month of January, which is mid-summer in that part of the world. The ground of the Heavens was blue, as in the first, and not above five or six clouds were perceptible above the Horizon; but each of them, white, black, cavernous, and of an enormous magnitude, resembled a portion of the Alps suspended in the air. This last was much less violent than the former, with its small ruddy vapours. In both, the sea was of the same beautiful azure colour with the sky; and, on the curling crests of the vast billows, rushing like so many cascades, were formed bright coloured rainbows.

These tempests, in the full blaze of light, are inexpressibly tremendous. The soul stands aghast at sight of the indications of tranquillity converted into signs of storm; the unclouded azure in the Heavens, and the rainbow playing upon the waves. The principles of harmony appeared to be completely inverted. Nature seemed to have put on a character of perfidiousness, and to conceal fury under the mask of benevolence.

The shallows of those Latitudes exhibit similar contrasts. *John Hugo de Linschotten*, who saw those of the Jewels, at no great distance, in the Mosambique channel, and upon which he was in extreme danger of making shipwreck, informs us, that they have a most hideous aspect, being black, white and green. Thus Nature increases the characters of terror, by intermingling with them certain agreeable expressions.

There is a farther observation, of essential importance, to be made in this place; namely, that in those awful scenes of danger and affright, the terrible is close upon you, and the agreeable is removed to an immense distance; tumult is in the seas, and serenity in the sky. A prodigious extension is thus given to the sentiment of disorder; for there is no apparent boundary set to tempests of this sort. All depends on the first impulsion which we undergo. The sentiment of infinity that is within us, and

which is ever making new efforts to propagate itself farther and farther, seeks to make its escape from the physical evil wherewith it is surrounded; but repelled, in some sort, by the serenity of the treacherous Horizon, falls back upon itself, and undergoes a severer pang, under the pressure of present painful affections, because their source has the appearance of being invariable.

Such is the Giant of Storms, stationed by Nature at the entrance of the Seas of India, and so well delineated by the pencil of *Camoëns*. Nature, in our climates, produces quite contrary effects, for during Winter, she redoubles our repose within doors, by covering the face of Heaven with dark and rainy clouds. All depends, as I have just said, on the first impulsion which the soul receives. *Lucretius* is, undoubtedly, right in saying, that our pleasure and security, on shore, are greatly increased by the sight of a storm at sea.

A Painter, accordingly, who wished to strengthen, in a picture, the effect of a beautiful landscape, and the felicity of its inhabitants, would only have to represent, in the back ground, a vessel at the mercy of the winds, and of the raging deep: The happiness of the shepherds would, in this case, be powerfully heightened by contrast with the distress of the mariners. But if it were his intention, on the contrary, to augment the horrors of a tempest, it would be necessary for him to place, in opposition to the distress of the mariners, the felicity of the shepherds; and, for this effect, the vessel must be introduced between the spectator and the landscape. The first sentiment depends on the first impulsion; and the ground contrasting with the scene, is so far from being a deviation from Nature, that the leading object is impressed with additional energy, by being thrown back upon itself. Thus, it is possible, with the same objects placed differently, to produce directly opposite effects.

If Nature, by introducing certain agreeable harmonies into scenes of discord, redoubles their confusion, such as

the green colour of the rocks of the Jewels, or the azure, in the tempests off the Cape, she frequently throws in a discordance, in concerts the most delightful, for the purpose of heightening the pleasurable effect. Thus, a noisy waterfall precipitating itself into a tranquil valley; or a rugged and dusky rock ascending in the midst of a verdant plain, enhances the beauty of a landscape. Thus a mole on a beautiful face gives it additional vivacity. Skilful Artists have sometimes happily imitated those harmonic contrasts. *Callot*, when he intended to aggravate the horror of his infernal scenery, introduced, amidst his demons, the head of a fine woman on the carcass of an animal. On the contrary, the most renowned Grecian Painters, in order to render *Venus* more interesting, represented her with a slight squint in her eyes.

Nature employs offensive contrasts only for the purpose of chasing Man away from some perilous situation. In all the rest of her Works, she employs only harmonic mediums. I must not involve myself in the examination of their different concerts; it is a subject whose riches are inexhaustible. All that could be expected from my scanty fund was the indication of a few of their principles. I shall endeavour, however, to trace a slight sketch of the manner in which she harmonizes the common fields of our harvests, these, being the production of human agriculture, seem abandoned to the monotony that characterizes most of the Works of Man.

First of all, it is remarkable, that we here find that charming shade of green, produced by the alliance of the two primordial opposite colours, which are the yellow and the blue. This harmonic colour decomposes itself, in its turn, by another metamorphosis, toward the time of the harvest, into the three primordial colours, namely, the yellow of the ripening corn, the red of the wild poppy, and the azure of the blue bottle. These two plants are found intermingled with the standing corn, all over Europe, let the farmer take what pains he may in lifting

the grain; and weeding his field. They form, by their harmony, a very rich purple tint, which rises admirably on the yellow ground of the cornfield.

If you study these two plants separately, you will find between them a variety of particular contrasts; for the blue bottle has narrow and slender leaves; but those of the poppy are broad, with deep incisions. The blue bottle has the corolla of its flowers radiating, and of a delicate azure; but those of the poppy are large and of a deep red. The blue bottle throws out divergent stalks; but those of the poppy are straight. We find, besides, among the corn, the cockle, or corn rose, which rises to the height of the expanded ear, with handsome purple flowers, in form of a trumpet; and the convolvulus, with a flesh coloured flower, crawling up along the reeds, and surrounding them with verdure, like a thyrsus. There is a great variety of other vegetables usually to be found growing among corn, and forming contrasts the most agreeable, most of them exhale the sweetest perfumes; and, when agitated by the Summer's breeze, you would be disposed, from their undulations, to imagine the whole a sea of verdure enamelled with flowers. Add to all the rest a gentle rustling of the ears against each other, most agreeably soothing, which, by its soft murmuring sound, invites to sleep.

These lovely forests of vegetable beauty are not destitute of inhabitants. You see bustling about under their shade, the green coated scarab, streaked with gold, and the monoceros, of the colour of burnt coffee. This last insect takes delight in a hillock of horse dung, and is furnished with a ploughshare on his head, with which he removes the ground like a labourer. There are, besides, a variety of charming contrasts in the bees and the butterflies, which are attracted by the flowers of the cornfield, and in the manners of the birds which inhabit them. The far travelled swallow is continually skimming along their surface, undulating like the waters of a lake; whereas

the stationary lark towers above the them, in a perpendicular direction, within sight of her nest. The domesticated partridge, and transitory quail, there find a situation equally favourable to both, for rearing their young. The hare frequently burrows in their neighbourhood, and quietly nibbles the wild thistle.

These animals have, with Man, relations of utility, from their fruitfulness and their furs. It is remarkable, that they are to be found over all the corn districts of Europe, and that their species are varied, according to all the variety of human habitation ; for there are different species of quails, partridges, larks, swallows and hares, adapted to the plains, to the mountains, to the heaths, to the meadows, to the forests and to the rocks.

As to the corn plant itself, it has relations innumerable with the wants of Man, and of his domestic animals. It is neither too high nor too low for his stature. It is easily handled and reaped. It furnishes grain to his poultry, bran to his pigs, forage and litter to his black cattle and his horses. Every plant that grows in his cornfield possesses virtues particularly adapted to the maladies incident to the condition of the labouring man. The poppy is a cure for the pleurisy ; it procures sleep ; it stops hemorrhages and spitting of blood. The blue bottle is a diuretic ; it is vulnerary, cordial, and cooling ; it is an antidote to the stings of venomous insects, and a remedy for inflammation of the eyes. Thus the husbandman finds all needful pharmacy, in the field which he cultivates.

The culture of this staff of life discloses to him many other agreeable concerts with his fleeting existence. The direction of its shadow informs him of the hour of the day ; from its progressive growth he learns the rapid flight of the seasons : He reckons the flux of his own fugitive years, by the successions of the guiltless harvests which he has reaped. He is haunted with no apprehension, like the inhabitants of great cities, of conjugal infidelity, or of a too numerous posterity. His labours are always surpass-

ed by the benefits of Nature. When the Sun gets to the sign of Virgo, he summons his kindred, he invites his neighbours, and marches at their head, by the dawning of the day, with sickle in hand, to the ripened field. His heart exults with joy as he binds up the swelling sheaves, while his children dance around them, crowned with garlands of blue bottles and wild poppies. Their harmless play recalls to his memory the amusements of his own early days, and of his virtuous ancestors, whom he hopes, at length, to rejoin in a better and happier World. The sight of his copious harvest demonstrates to him that there is a GOD ; and every return of that joyous season, bringing to his recollection the delicious eras of his past existence, inspires him with gratitude to the Great Being who has united the transient society of men, by an eternal chain of blessings.

Ye flowery meadows, ye majestic, murmuring forests, ye mossy fountains, ye desert rocks, frequented by the dove alone, ye enchanting solitudes, which charm by your ineffable concerts ; happy is the man who shall be permitted to unveil your hidden beauties ! but still happier far is he who shall have it in his power calmly to enjoy them in the inheritance of his forefathers !

OF SOME OTHER LAWS OF NATURE, HITHERTO IMPERFECTLY KNOWN.

There are, besides those which have been mentioned, some physical Laws, not hitherto profoundly investigated, though we have had a glimmering of them, and made them the frequent subject of conversation. Such is the Law of attraction. It has been acknowledged in the planets, and in some metals, as in iron and the loadstone, in gold and mercury. I believe attraction to be common to all metals, and even to all fossils ; but that it acts, in each of

them, in particular circumstances, which have not hitherto been observed, and ascertained. Each of the metals, perhaps, may have a disposition to turn toward different points of the Earth, as magnetic iron points toward the North, and toward places where there are mines of iron. It would probably be necessary, in order to ascertain this by experiment, that each metal should be armed with its proper attraction ; this takes place, as I think, when it is united to its contrary.

How do we know, whether a needle of gold, rubbed with mercury, might not have attractive poles, as a needle of steel has, when rubbed with the magnet ? Thus prepared, or in some other way adapted to its nature, it might possibly indicate the places which contain mines of that rich metal. Perhaps it might determine the general points of direction to the East or to the West, which might serve as an indication of the Longitudes, more steadily than the variations of the magnetic needle.

If there be a point at the Pole, on which the Globe seems to revolve, there may, possibly, be one under the Equator, from which its rotatory motion has commenced, and which may have determined its motion of rotation. It is very remarkable, for example, that all seas are filled with univalve shell fish, of an infinity of very different species, which all have their surrounding spirals, in an increasing progression, and in one and the same direction, that is, from left to right, like the motion of the Globe, when the mouth of the shell is turned northward, with the base to the ground. There is only a very small number of species which may be considered as exceptions, and which have, for this very reason, been denominated *unique* (singular, or extraordinary.) The spirals of these circulate from right to left.

A direction so general, and exceptions so particular in univalve shell fish, undoubtedly have their causes in Nature, and their epochas, in the unknown ages when their germs were created. It is impossible that they should

proceed from the actual influence of the Sun, who acts on them in a thousand different aspects. Can they have been thus directed in a conformity to some general Current of the Ocean, or to some unknown attraction of the Earth, toward the North or the South, toward the East or the West? These relations will appear strange, and perhaps frivolous, to our men of Science; but every thing in Nature is a series of concatenation. A slight observation here, in many cases, leads to important discovery. A small plate of iron turning toward the North, guides a whole Navy through the deserts of the Ocean; and a reed of an unknown species, thrown on the coast of the Azores, suggested to *Christopher Columbus* the existence of a western World.

Whatever may be in this, certain it is, that there exists a great number of those particular points of attraction, scattered over the Earth, such as the matrices which renovate the mines of metals, by attracting to themselves the metallic parts dispersed in the elements. It is by means of attractive matrices, that those mines are inexhaustible, as has been remarked in many places, among others, in the Isle of Elba, situated in the Mediterranean. This little island is entirely a mine of iron, from which had been already extracted, in the time of *Pliny*, an immense quantity of that metal, without its being perceptible, as he tells us, that it was in the smallest degree diminished. Metals have, besides, other attractions; and if I might presume to deliver my opinion by the way, I consider these themselves as the principal matrices of all fossil bodies, and as the ever active means employed by Nature for repairing the mountains and the rocks, which the action of the other elements, but, especially, the injudicious labours of men, have an incessant tendency to impair.

I shall here remark, on the subject of mines of gold, that they are placed, as well as those of all metals, not only on the most elevated part of Continents, but in icy mountains.

The celebrated gold-mines of Peru, and of Chili, are, it is well known, in the Cordeliers. The gold mines of Mexico are situated in the vicinity of Mount St. Martha, which is covered with snow all the year round. The rivers of Europe, which wash down particles of gold along their shores, issue from icy mountains. The Po, in Italy, has its source in those of Piedmont. But without quitting France, we reckon ten greater or smaller rivers, which roll along gold dust, intermingled with their sands, and which have all of them their origin in mountains of ice. Such is the Rhine, from Strasburg to Philipsburg; the Rhone, in the Pais de Gex; the Doux, in Franche Comté, which three all take their rise in the icy mountains of Switzerland. The Cese and the Gardon descend from those of the Cevennes. The Ariege, in the Pais de Foix; the Garonne, in the vicinity of Tholouse; the Salat, in the County de Conserans; and the rivulets of Ferriet and Benagues, all take their rise in the icy mountains of the Pyrenneés.

This observation may be extended, I believe, to all the gold mines in the World, even to those of Africa, such of whose rivers as wash down the greatest quantities of gold dust, the Senegal, for instance, descend from the mountains of the Moon.

To this it may be objected, that gold was formerly found in Europe, in places where there were no icy mountains; nay, that some has been picked up on the surface of the ground, as in Brasil; and not many years ago, that there was found an ingot, or mass, of several pounds weight, on the bank of a river in the district of Cinaloa, in New Mexico. But, if I might venture to hazard a conjecture, respecting the origin of this gold, scattered about on the surface of the earth, in the ancient Continent of Europe, and especially in that of the New World; I believe it to have proceeded from the total effusions of the ices of the mountains, which took place at the time of the Deluge; and that, as the spoils of the Ocean covered

the western parts of Europe, that those of vegetable earths were spread over the eastern part of Asia, those of minerals, from the mountains, were forced along other countries, where their fragments were found, in the earlier ages, in grains, and even in larger masses.

This much is certain, that when *Christopher Columbus* discovered the Lucayo and Antilles islands, he found among those islanders abundance of gold of a base alloy, the produce of the traffick which they carried on with the inhabitants of the Continent; but they had no mines within their own territory, notwithstanding the prejudice then entertained, and under which many labour to this day, that the Sun formed this precious metal in the earth of the Torrid Zone. For my own part, I find, as I have just observed, gold much more common in the vicinity of icy mountains, whatever their Latitude may be; and I conjecture, from analogy, that there must be very rich mines of it in the North. It is extremely probable, that the waters of the Deluge hurled along considerable portions of that metal to the northern countries.

We read, I think, in the Book of Job, the Arabian, this remarkable expression; "Gold cometh from the North."* Certain it is, that the first commerce of India with Europe was carried on by the North, as has been clearly demonstrated by the Baron *de Strahlenberg*, a Swedish exile, after the battle of Pultowa, in Siberia, of which he has given a very intelligent and accurate description. He says, that it is still possible to pursue, by evident traces, the track of the ancient Indians along the

* This is not entirely of a piece with our Author's usual accuracy. It is written, indeed, in the Book of Job, chap. xxxvii. ver. 9. "Gold cometh out of the North;" and ver. 22. "Fair weather cometh out of the North;" but no where in Scripture, so far as I know, is this affirmed of Gold. *St. Pierre* seems to have quoted from general and indistinct recollection; happy, no doubt, to have, as he thought, a text from the Bible to support his conjecture. But notwithstanding this defect, his reasoning is plausible, and the human testimony which he adduces respectable.

river of Petzora, which empties itself into the White Sea. On its banks, in various places, are found many of their tombs, which contain, some of them, manuscripts on silk stuffs, in the language of *Thibet*; and there are perceptible, on the rocks along its shores, characters which they have traced upon them, in a red which cannot be effaced. From this river they forced their way through the lakes, by means of leathern boats, to the Baltic; or coasted along the northern and western shores of Europe.

This track was known to the Indians, even from the time of the ancient Romans; for *Cornelius Nepos* relates, that a King of the Suevi made a present to *Metellus Celer* of two Indians, who had been thrown, by stress of weather, with their leathern canoe, on the coasts adjacent to the mouth of the Elbe. It is not easy to conceive what those Indians, the inhabitants of a warm country, were going in quest of, so far to the North. What use could they have made, in India, of the furs of Siberia? It would appear they went thither in search of gold, which might then be frequently discoverable to the North, at the surface of the earth.

Whatever may be in this, it is presumable that, as mines of gold are placed in the most elevated regions of the Continent, their matrices collect, in the Atmosphere, the volatilized particles of gold, which ascend thither with the fossil and aquatic emanations, conveyed by the winds from every quarter. But they exercise over men, attractions still much more powerful.

It would appear as if Nature, by burying the focuses of this rich metal under the snows, had intended to fence it with ramparts still more inaccessible than the flinty bosom of the rock, lest the undismayed ardor of human avarice should, at length, destroy them entirely. It has become the most powerful bond of society, and the perpetual object of all the labours of a life so rapidly hurrying to a close. Alas! Were Nature, at this day, to inflict condign punishment on this insatiable thirst in the Na-

tions of Europe, for a metal so useless, as a real necessary of human life, she has only to change the territory of some one of them into gold. Every other Nation would instantly flock thither, and, in a little time, exterminate its wretched inhabitants. The Peruvians and Mexicans have had the dreadful experience of this.

There are metals not so highly prized, but much more useful, the elementary attractions of which might, perhaps, procure us very important accomodations.

The peaks of the mountains, and their lengthened crests, are filled, as we have seen, with iron or copper, intermingled with a vitreous body, of granite, or of natural crystal, which attracts the rains and the stormy clouds, like so many real electric needles. There is not a seaman but what has seen, a thousand times, those peaks, and those crests, covered with a cloudy cap, gathered round and round, and concealing them entirely from view, without once suspecting the cause of this appearance. Our Philosophers, on the other hand, deducing their conclusions merely from the inspection of charts, have taken those rocky protuberances for the wrecks of a primitive earth, without giving themselves any trouble about their effects.

They ought to have observed, that those metallic pyramids and crests, as well as most mines of iron and copper, are always to be found in elevated situations, and at the source of all rivers, of which they are the primitive causes, by means of their attractions. Their general inattention to this subject is thus only to be accounted for; seamen observe, and do not reason; and the learned reason, but do not observe. Undoubtedly, had the experience of the one been united to the sagacity of the other, prodigies of discovery might have been expected.

I am persuaded that, in imitation of Nature, it might be possible for us to acquire the art of forming, by means of electric stones, artificial fountains, which should attract the rainy clouds in parched and dry situations, as

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and rods of iron attract thunder clouds. It is true, that Princes must be at the expence of such costly and useful experiments; but it is the way for them to immortalize their memory. The *Pharaohs*, who built the pyramids of Egypt, would not have drawn upon themselves the curses of their subjects, as *Pliny* assures us they did, for their enormous and uselefs labours, had they reared, amidst the sands of Upper Egypt, an electrical pyramid, which might there have formed an artificial fountain. The Arab who should resort thither, at this day, to quench his thirst, would still pronounce benedictions on names which, if we may believe the great Natural Historian, had already sunk into oblivion, and ceased to be mentioned, in his time.

For my own part, I think that several metals might be proper for producing similar effects. An officer of high rank, in the service of the King of Prussia, informed me that, having remarked vapours to be attracted by lead, he had employed its attraction for drying the atmosphere of a powder magazine. This magazine was constructed under ground, in the throat of a bastion, but had been rendered of no use whatever, from its humidity. He ordered to line with a coat of lead the concave ceiling of the arch, which was before planked over, where the gunpowder was deposited in barrels: The vapours of the vault collected in great drops, on the leaden roof, run off in streamlets along the sides, and left the gunpowder barrels perfectly dry.

It is to be presumed that every metal, and every fossil, has its peculiar repulsion as well as its attraction; for these two Laws always go hand in hand. Contraries seek out each other.

There are, farther, a multitude of other harmonic Laws, as yet undiscovered; such are the proportions of magnitudes, and of the durations of existence, in beings vegetative and sensible, which differ exceedingly, though their nutriment and climates may be the same. Man, while yet a youth, sees the dog, his companion and contemporary,

die of old age ; and also the sheep, which he fondled when a lamb. Though the former lived at his own table, and the other on the herbage of his meadow, neither the fidelity of the one, nor the temperance of the other, was able to prolong their days ; whereas animals which live only on carrion and garbage, live for ages, as the crow. It is impossible to guide ourselves in prosecuting such researches, any other way than by following the spirit of conformity, which is the basis of our own reason, as it is that of the reason of Nature.

By consulting this, we shall find, that if such and such a carnivorous animal is long lived, as the crow for instance, it is because his services and his experience are long necessary for purifying the earth, in places whose impurities are incessantly renewing, and which are frequently at great distances from each other. If, on the contrary, an innocent animal lives but a little while, it is because his flesh and his skin are necessary to Man. If the domestic dog, by his death, frequently diffuses sorrow over the children of the family, whose intimate friend and fellow boarder he was, Nature, undoubtedly, intended to give them, in the loss of an animal so worthy of the affections and the regret of the heart of Man, the first experience of the privations with which human life is to be exercised.

The duration of an animal's life is sometimes proportioned to the duration of the vegetable on which it feeds. A multitude of caterpillars are born, and die with the leaves by which their transitory existence is supported. There are insects whose being is limited to five hours ; such is the ephemera. This species of fly, about half as large as the tip of the little finger, is produced from a fluviatic grub, which is found particularly at the mouths of rivers, close by the water's edge, in the mud, into which it digs in quest of subsistence. This grub lives three years, and at the termination of that period, about Midsummer day, it is transformed, almost instantaneously, into a fly, which comes into the world at six o'clock in

the evening, and dies about eleven at night. No longer space of time is necessary for copulation, and for depositing the eggs on the mud which the water has deserted.

It is very remarkable, that this insect copulates, and lays her eggs, precisely at the time of the year when the tides are at the lowest, when the rivers discover, at the place of their discharge, the greatest part of their channel dry. Wings are then furnished, to enable her to go and deposit her eggs in places which the waters forsake, and to extend, in the capacity of a fly, the domain of her posterity, at the time when, as a worm, her territory is most contracted. I have likewise remarked, in the microscopic drawing and dissections given of this insect by the ingenious *Thevenot*, in the last parts of his collection, that in her fly state, she has neither interior nor exterior organs of nutrition. They would have been entirely useless to a life of such transient duration.

Nature has made nothing in vain. It is not credible that she should have created momentary lives, and beings infinitely minute, to fill up imaginary chains of existence. The Philosophers who ascribe to her these pretended plans of universality, which are destitute of every shadow of proof, and which make her descend into the infinitely small, for purposes equally frivolous, would represent her as acting somewhat like a mother, who gives, as toys to amuse her children, tiny coaches, and minute articles of household furniture, of no use in the world, but which are imitations of domestic utensils.

The aversions and the instincts of animals emanate from Laws of a superior order, which we shall never be able to penetrate into in this world; but, supposing those intimate conformities to elude our researches, they must be referred, like every other, to the general conformity of beings, and especially to that of Man. There is nothing so luminous in the study of Nature, as to refer every thing that exists to the goodness of GOD, and to the demands of humanity. This method of viewing objects not only

discovers to us a multitude of unknown laws, but it sets bounds to those which we do know, and which we believe to be universal.

If Nature, for example, were governed by the Laws of attraction only, according to the supposition of those who have made it the basis of so many systems, every thing in it would be in a state of rest. Bodies, tending toward one common centre, would there accumulate, and arrange themselves round it, in the ratio of their gravity. The substances which compose the Globe, would be so much heavier as they approached nearer to the centre, and those which are at the surface, would all be reduced to a level. The basin of the Seas would be choked with the wrecks of the Land; and this magnificent architecture, formed of harmonies so various, would soon become an aquatic Globe entirely. All bodies hurled downward by one common precipitation, would be condemned to an everlasting immobility.

On the other hand, if the Law of projection, which is employed for explaining the motions of the heavenly bodies, on the supposition that they have a tendency to fly off in the tangent of the curve which they describe; if, I say, this Law predominated, all bodies, not actually adherent to the Earth, would be hurled from it, like stones from a sling: Our Globe itself, subjected to this Law, would fly off from the Sun never to return. It would sometimes traverse, in its unbounded career, the spaces of immensity, where no star would be perceptible during the course of many ages; sometimes, swinging through regions where chance might have collected the matrices of Creation, it might pass along amidst the elementary parts of Suns, aggregated by the central Laws of attraction, or scattered about in sparks and in rays, by those of projection.

But, on the supposition that these two contrary forces were combined happily enough in favour of the Globe, to fix it, with its vortex, in a corner of the firmament,

where these forces should act without destroying themselves, it would present its Equator to the Sun with as much regularity as it describes its annual course round him. From those two constant motions never could be produced that other motion so varied, by which it daily inclines one of its Poles toward the Sun, till its axis has formed, on the plane of its annual circle, an angle of twenty three degrees and an half; then that other retrograde motion, by which it presents to him, with equal regularity, the opposite Pole. Far from presenting to him alternately its Poles, in order that his fertilizing heat may, by turns, melt their ices, it would retain them buried in eternal night and Winter, with a part of the temperate Zones, whereas the rest of its circumference would be burnt up by the too constant fires of the Tropics.

But if we suppose, together with those constant Laws of attraction and projection, a third variable Law, which gives to the Earth the movement that produces the seasons, and a fourth, which gives it the diurnal motion of rotation round itself; and that no one of these Laws, so opposite, should ever surpass the others, and, at last, determine it to obey but one single impulsion; it would be impossible to affirm, that they had determined the forms and movements of the bodies which are on its surface. First, the force of projection, or centrifugal, would not have left upon it any one detached body. On the other hand, the force of attraction, or gravity, would not have permitted the mountains to rise, and still less the metals, which are the heaviest part of them, to be placed at their summits, where they are usually found.

If we suppose that those Laws are the *ultimatum* of chance, and that they are so combined, as to form, among themselves, but one single Law; for the same reason that they make the Earth move round the Sun, and the Moon round the Earth, they ought to act in the same manner on the particular bodies which are at the surface of the Globe. We ought to see the rocks detached, the fruits

separated from the trees, the animals which are not provided with claws turning round it in the air, as we see the particles which compose *Saturn's* ring turn round that Planet.

It is the gravity, they repeat, which acts only at the surface of the Globe, that hinders bodies to detach themselves from it. But if it there absorbs the other powers, Wherefore, as we have already asked, did it permit the mountains to rise? How comes it that the centrifugal force should have been able to exalt, to a prodigious height, the long ridge of the Cordeliers, while it has left immoveable the volatile scurf of snow which covers them? For what reason, if the action of gravity is still universal, has it no influence on the soft bodies of animals, when, shut up in the womb of the mother, or in the egg, they are in a state of fluidity? All the numerous progeny of the Earth, animals and vegetables, ought to be rounded into balls, like their mother. The weightiest parts of their bodies, at least, ought to be situated undermost, especially in those which possess self motion; on the contrary, they are frequently uppermost, and supported by limbs much lighter than the rest of the animal, as in the case of the horse and the ox. Sometimes they are between the head and the feet, as in the ostrich; or at the extremity of the body, in the head, as in the human species. Others, such as the tortoise, are flattened; others, such as reptiles, are drawn out in form of spindles; all of them, in a word, have forms infinitely varied.

Vegetables themselves, which seem entirely subjected to the action of the elements, have configurations diversified without end. But, How comes it that animals have in themselves the principles of so many motions, so entirely different? Wherefore has not gravity nailed them down to the surface of the Earth? They ought to crawl along it at most. How comes it to pass, that the Laws which regulate the course of the Stars; those Laws whose influence has, in modern times, been made to extend even

to the operations of the human soul, should permit the birds to rise into the air, and fly as they please to the West, to the North, to the South, notwithstanding the united powers of the attraction, and of the projection of the Globe ?

It is conformity, adaptation to use, which has regulated those Laws, and which has generalized, or suspended their effects, in subordination to the necessities of sensible beings. Though Nature employs an infinity of means, she permits Man to know only the end which she has in view. Her Works are subjected to rapid dissolutions ; but she always suffers him to perceive the immortal consistency of her plans. It is on this she wishes to fix his heart and mind. She aims not at rendering Man ingenious and proud ; her object is to render him good and happy. She universally mitigates the evils which are necessary ; and universally multiplies blessings in many cases superfluous. In her harmonies, formed of contraries, she has opposed the empire of death to that of life ; but life endures for a whole age, and death only an instant. She allows Man long to enjoy the expansions of beings, so delightful to behold ; but conceals from him, with a precaution truly maternal, their transient states of dissolution.

If an animal dies ; if plants are decomposed in a morass, putrid emanations, and reptiles of a disgusting form, chase us away from them. An infinite number of secondary beings are created for the purpose of hastening forward the decompositions. If cavernous mountains and rocks present appearances of ruin ; owls, birds of prey, the ferocious animals, which have made them their retreat, keep us at a distance from them. Nature drives far from us the spectacles and the ministers of destruction, and allures us to her harmonies. She multiplies them, in subserviency to our necessities, far beyond the Laws which she seems to have prescribed to herself, and beyond the measure which we had reason to expect. It is thus that the dry and barren rocks repeat, by their echos, the mur-

muring sound of the waters and of the forests ; and that the plane surfaces of the waters, which have neither forests nor hills, represent their colours and forms by reflecting them.

From a profusion of this unbounded benevolence of Nature it is, that the action of the Sun is multiplied wherever it was most necessary ; and is mitigated in all the places where it would have been hurtful. First, the Sun is five or six days longer in our northern Hemisphere, because that Hemisphere contains the greatest part of the Continents, and is the most inhabited. His disk appears in it before he rises, and after he is set ; which, added to its twilights, considerably increases the natural length of our days. The colder that it is, the farther does the refraction of his rays extend. This is the reason that it is greater in the morning than in the evening, in Winter than in Summer, and at the beginning of Spring than at the beginning of Autumn.

When the Orb of Day has left us, during the night season, the Moon appears, to reflect his light upon us, with varieties in her phases which have relations, hitherto unknown, to a great number of species of animals, and especially of fishes, which travel only in the night time, at the epochas which she indicates to them. The farther that the Sun withdraws from one Pole, the more are his rays refracted there. But when he has entirely abandoned it, then it is that his light is supplied in a most wonderful manner. First, the Moon, by a movement altogether incomprehensible, goes to replace him there, and appears perpetually above the Horizon, without setting, as was observed in the year 1596, at Nova Zembla, by the unfortunate Dutchmen who wintered there, in the 76th degree of North Latitude.

It is in those dreadful climates, that Nature multiplies her resources, in order to bestow on sensible beings the benefits of light and heat. The Heavens are there illuminated with the *aurora borealis*, which darts up to the

very zenith rays of moving light, gold coloured, white and red. The Poles sparkle with stars more luminous than those which appear in the rest of the firmament. The snows which cover the ground shelter part of the plants, and, by their lustre, dispel the darkness of night. The trees are clothed with thick mosses, which catch fire from the smallest spark; the very ground is covered with them, especially in the woods, to so great a depth, that I have, oftener than once, sunk, in the Summer time, up to the knees, in those of Russia: Finally, the animals, which inhabit those regions, are robed in fur to the very tip of their claws.

When the season returns for restoring heat to those climates, the Sun reappears there a considerable time before his natural term. Thus, the Dutch mariners, whom I have just mentioned, saw him, to their astonishment, above the Horizon of Nova Zembla, on the twentyfourth of January, that is, fifteen days sooner than they expected him. This return, so much earlier than their hopes had fashioned it, filled them with joy, and disconcerted the calculations of their intelligent pilot, the unfortunate *Barents*.

It is then that the Star of Day there redoubles his heat and his light, by means of the parheliions, which, like so many mirrors formed in the clouds, reflect his disk upon the Earth. He calls from Africa the winds of the South, which, passing over Zara, whose sands are then violently heated by the vicinity of the Sun to their Zenith, load themselves with igneous particles, and proceed to attack, like battering rams of fire, that tremendous cupola of ice which covers the extremity of our Hemisphere. Its enormous vaultage, dissolved by the heat of those winds, and loosened by their violent agitations, detaches itself in fragments as lofty as mountains; and, floating at the discretion of the Currents, which sweep them along toward the Line, they advance sometimes as far as to the 45th degree, cooling the Seas of the South, by their vast effu-

sions. Thus the ices of the Pole communicate coolness to the heated seas of Africa, just as the burning sands of Africa transmit warm winds to dissolve the ices of the Pole.

But as cold is, in its turn, a very great blessing in the Torrid Zone, Nature employs a thousand methods to extend the influence of it in that Zone, and to mitigate in it the heat and the light of the Sun. First, she destroys there the refractions of the Atmosphere. There is scarcely any twilight between the Tropics, to precede the rising of the Sun, and still less after his setting. When he is in the Zenith, he veils himself with rainy clouds, which cool the ground, both by their shade and by their showers. Besides, those clouds being frequently impregnated with thunder, the explosion of their fires dilates the superior stratum of the Atmosphere, which is icy at the height of two thousand five hundred fathom, under the Line, as is evident from the snows which perpetually cover, at that height, the summits of some of the Cordelier mountains. They cause to flow down, by their explosions and concussions, columns of that air, congealed in the superior regions of the Atmosphere, into the inferior, which are suddenly cooled by it, as we feel it to be in our own climates, in Summer, immediately after a thunder storm.

The effusions of the polar ices, in like manner, cool the seas of the South; and the polar winds frequently blow on the hottest parts of their shores. Nature has, farther, placed in the very heart of the Torrid Zone, and in its vicinity, chains of icy mountains, which accelerate, and redouble the effects of the polar winds, especially along the seas, where fermentation was most to be dreaded, from the alluvions of the bodies of animals, and of vegetables, which the waters are there continually depositing. Thus, the chain of Mount Taurus, eternally covered with snow, commences in Africa, on the burning shores of Zara, and, coasting the Mediterranean, passes on

into Asia, where it extends long arms, this way and that, which embrace the gulfs of the Indian Ocean. In America, in the same manner, the extensive chains of the Cordeliers of Peru and Chili, with the elevated ridges in which it crosses Brasil, cools the lengthened and burning shores of the South Sea, and of the gulf of Mexico.

These elementary dispositions are only part of the resources of Nature, for mitigating the heat in warm countries. She there shades the ground with creeping vegetables and trees, in form of a parasol, some of which, such as the cocoa tree of the Sechelles Islands, and the talipot of Ceylon, have leaves from twelve to fifteen feet long, and from seven to eight feet broad. She clothes the animals of those regions with hairless skins, and colours them, in general, as well as the verdure, with dark and dusky tints, in order to diminish the reflexes of the heat and of the light. This last consideration leads me here to suggest a few reflexions on the effects of colours; the little which I shall advance on this subject, will be sufficient to produce conviction, that their generations are not the effect of chance; that it is from reasons profoundly wise we find one half of them proceed, in compounding themselves, toward the light; and in their decomposition, toward darkness; and that all the harmonies of this World are produced by contraries.

Naturalists consider colours as accidents. But, if we attend to the general uses for which Nature employs them, we shall be persuaded that there is not, even on rocks, a single shade impressed without a meaning and a purpose. Let us observe, in the first place, the principal effects of the two extreme colours, white and black, with relation to the light. Experience demonstrates that, of all colours, white is that which best reflects the rays of the Sun, because it sends them back without any tint, as pure as it receives them; and that black, on the contrary, is the least adapted to their reflection, because it absorbs them. This

is the reason why gardeners whiten the walls against which their espaliers are planted, in order to accelerate the maturity of their fruits, by the reverberation of the Sun's rays ; and why opticians blacken the walls of the *camera obscura*, that their reflexes may not disturb the luminous picture on the tablet.

Nature, of consequence, frequently employs to the North the white colour, in order to increase the light and heat of the Sun. Most of the lands there are whitish, or of a clear gray. The rocks and sands of northern regions are filled with mica and specular particles. Farther, the whiteness of the snows, which cover them in Winter, and the vitreous and crystalline particles of their ices, are exceedingly adapted to mitigate the action of the cold, by reflecting the light and heat in the most advantageous manner. The trunks of the birch trees, of which the greatest part of their forests consist, are covered with a bark as white as paper. Nay, in some places, the earth is clothed with a vegetation completely white.

“ In the eastern part,” says an intelligent Swede, “ of the lofty mountains which separate Sweden from Norway, exposed to the utmost rigor of the cold, there is a very thick forest, and singular in this respect, that the pine which grows there is rendered black, by a species of filamentous lichen, which hangs upon it in great abundance ; whereas the ground is covered every where around with a white lichen, which, in lustre, rivals the snow.*”

Nature there bestows the same colour on most animals, such as the white bear, the wolf, the partridge, the hare, the ermine ; others perceptibly whiten to a certain degree in Winter, such as foxes and squirrels, which are reddish in Summer, and light gray in Winter. Nay, if we consider the

* Extract from the Natural History of the rein deer, by Charles Frederick Hoffberg, translated by M. le Chevalier de Keralio.

filiform figure of their hair, its varnish and transparency; we shall be sensible that it is contrived in the most proper manner for reflecting and refracting the rays of light. We ought not to imagine this whiteness is a degeneration, or enfeebling of the animal, as Naturalists have done with respect to the human hair, which whitens in old age, as they tell us, from a failure of radical moisture; for nothing can be of a closer contexture than most of those furs, nor any thing more vigorous than the animals which are arrayed in them. The white bear is one of the strongest and most formidable of animals in the world; it frequently requires several musket shot to bring him down.

Nature, on the contrary, has tinged with red, with blue, with dusky, and black tints, the soil, the vegetables, the animals, nay, even the men, who inhabit the Torrid Zone, for the purpose of there absorbing the fires of the burning Atmosphere with which they are surrounded. The lands, and the sands of the greatest part of Africa, situated between the Tropics, are of a reddish brown, and the rocks are of a black hue. The Islands of France and of Bourbon, which are on the border of that Zone, are, in general, of the same dark complexion. I have seen there chickens and parroquets, not only whose plumage, but the skin itself, was dyed black. I have likewise seen, in those islands, fishes entirely black, and especially among the species which live near the surface of the water, over the shallows, such as the old woman and the thornback.

As animals whiten, in Winter, toward the North, in proportion as the Sun withdraws from them, those of the South assume dark and dusky tints, in proportion as the Sun approaches to them. When he is in the Zenith, the sparrows of the tropical countries have breastplates, and the plumage of the head, completely red. There are birds in those regions which change their colour three times every year, having, if I may use the expression, one dress for Spring, another for Summer, and a third for

Winter, according as the Sun is in the Line, in the Tropic of Cancer, or in that of Capricorn.*

This, too, is very remarkable, and of consequential importance to the use which Nature makes of these colours, to the North, and to the South ; namely, that in all countries, the whitest part of the body of an animal is the belly, because more heat is wanted there for promoting digestion, and carrying on the other animal functions ; and, on the contrary, the head is universally most strongly coloured, especially in those of hot countries, because, in the animal economy, that part stands most in need of being kept cool.

It cannot be maintained, that the bellies of animals preserve their whiteness, because that part of the body is sheltered from the Sun ; and that their heads assume strong colouring, from being more exposed to his influence. It might appear, from reasons of analogy, that the natural effect of light ought to be, to invest with its lustre all the objects which it touches ; and that, conformably to this, the soil, the vegetables, and the animals of the Torrid Zone ought to be white ; and that darkness, on the

* The white colour, accordingly, increases the effect of the rays of the Sun, and the black weakens it. The inhabitants of Malta whiten the inside of their apartments, in order, as they allege, to render the scorpions perceptible, which are very common in that island. In doing this, if I am not mistaken, they commit two errors ; the first, in misapprehending the colour : For the scorpions, which there are gray, would appear still better on a dark ground ; the second, and one of much greater importance, is their increasing to such a degree the reverberation of the light, that the eye-sight is sensibly affected by it. To this cause I principally ascribe the disorder of the eye so frequently complained of by those islanders. Our trades people wear white hats, in Summer, when in the country, and complain of headaches. All these evils arise from neglecting to study Nature. In the Isle of France they employ, for wainscoting, the wood of the country, which in time becomes entirely black ; but this tint is too gloomy. It seems as if Nature had foreseen, in this respect, the services which Man was to derive from the interior of trees : Their timber is brown in most of those of hot countries, and white in those of the northern regions, such as the fir and the birch.

contrary, acting for several months together on the Poles, ought to clothe every object, within those regions, in robes of mourning. But Nature subjects not herself to mechanical Laws. Whatever may be the physical effect of the presence of the Sun, or of his absence, she has contrived, toward the North, to impose very black spots on the whitest bodies, and, to the South, white spots on the the darkest bodies. She has blackened the tip of the tail of the Siberian ermine, in order that these little animals, which are white all over, as they march along the snow, where they scarcely leave any traces of their footsteps, may be enabled to distinguish each other, when proceeding in a train, in the luminous reflexes of the long nights of the North.

Perhaps, too, this blackness, opposed to the white, may be one of those decided characteristics with which she has marked beasts of prey; such as the extremity of the black snout, and the black paws of the white bear. The ermine is a species of weasel. There are, likewise, in the North, foxes completely black; but they are indemnified, for the influence of the white colour, by the warmest and thickest of furs; it is the most valuable of all those of the North. Besides, this species of foxes is very rare, even in those countries. Nature has, perhaps, clothed them in black, because they live in subterraneous places, in the midst of warm sands, or in the vicinity of certain volcanoes, or for some other reason, to me unknown, but corresponding to their natural calls. It is thus she has clothed in white the paillencu, or bird of the Tropics, because this bird, which flies at a prodigious elevation above the Sea, passes part of its life in the vicinity of a frozen Atmosphere. These exceptions by no means destroy the general adaptation of those two colours; on the contrary, they confirm it, seeing it is employed by Nature for diminishing, or increasing, the heat of the animal, in conformity to the temperature of the place where it lives.

I now leave it to Naturalists to explain how it comes to pass, that cold should cause to vegetate the hair of animals in the North; and why the heat should shorten, or cause to fall off, the hair of animals, to the South; in contradiction to all the Laws of systematic, nay, of experimental Physics; for we are assured, from our personal experience, that Winter retards the growth of the human hair and beard, and that Summer accelerates it.

I believe I have a glimpse of a law very different from the Law of analogies, which we so commonly assign to Nature, because it allies itself to our weakness, by affording us a pretence to explain every thing, with the assistance of a small number of principles. This Law, infinitely varied in its means, is that of *compensations*.* It is a consequence from the universal Law, or the mutual adaptation of things, and a sequel of the union of contraries, whereof the harmonies of the universe are composed.

* In reflecting on these compensations, which are very numerous, and, among others, on those of the light of the Sun, which embrowns bodies in order to weaken the reflexes of them, it has suggested itself to my thoughts, that fire must, in like manner, produce matter the best adapted to diminish its own activity. And of this I have, in fact, made frequent proof, by throwing a little ashes on the flame blazing on my hearth. By this means I have been able to quench it suddenly almost without smoke. I recollect, to this purpose, having, some time ago, seen, in one of our seaports, a great caldron full of pitch, catch fire, which they were heating for careening a ship. Inexperienced persons immediately attempted to extinguish the flame by throwing water upon it; but the boiling and inflamed matter spread but the more violently, in torrents of fire, over the brim of the caldron; I did not think a single ladle full would be left within the vessel, when an old seaman ran up, and instantly brought it down by throwing upon it a few shovels full of ashes. I believe, therefore, that, by uniting this application with that of water, great assistance might be derived in case of conflagrations; for the ashes would not only deaden the flame, without exciting that dreadful smoke which arises from it, as soon as the engines begin to play, but when once thoroughly moistened, they would retard the evaporation of the water, which is almost instantaneous, when the fire has made a considerable progress. It would afford me inexpressible satisfaction, should this observation merit the attention of those who have ability to give it, from their experience, sagacity and influence, all the utility of which it is susceptible.

Thus it frequently happens, that effects, so far from being the results of causes, are opposite to them. For example, it has pleased Nature to clothe in white several birds, the inhabitants of warm regions, such as the heron of the Antilles, and the perroquet of the Moluccas, called *cacatoës*; but she has bestowed, at the same time, on their plumage, a disposition which weakens the reflection of it.

Farther, it is very remarkable, that she has furnished the heads of those birds with tufts and plumes of feathers, which overshadow them, because, as was formerly observed, the head is that part of the body, which, in the animal economy, stands most in need of being kept cool. Such is our crested hen, which comes originally from Numidia. Nay, I do not believe, that there are to be found in any but southern countries, birds with tufted heads. If there are some toward the North, as the lapwing, they make their appearance there only in Summer. Most of those of the North, on the contrary, have the belly and the feet clothed with tippets formed of down, similar to the finest of wool.

This, likewise, is farther worthy of remark, respecting the white birds and quadrupeds of the South, which live in a hot Atmosphere, namely, if I am not mistaken, that the skin of them all is black, which is sufficient to counterbalance the reflection of the colour of their exterior dress. *Robert Knox*, in speaking of certain white quadrupeds of the Island of Ceylon, says, that their skin is entirely black. I myself recollect to have seen, at Port l'Orient, a *cacatoës*, whose stomach had been stripped of the feathers, and displayed a skin as black as that of a Negro. When this white bird, with his black beak, and black and naked breast, erected his plume, and clapped his wings, he had the complete air of an Indian King, with his crown, and mantle of feathers.

This Law of compensations employs, therefore, means infinitely varied, which contradict most of the Laws which

we have laid in Physics ; but this Law must itself be subjected to that of general accommodation or conformity ; without which, were we to attempt to render it universal, it would involve us, in its turn, in the common error. It has given rise, in Geometry, to several axioms extremely doubtful, though of great celebrity, such as the following ; *the action is equal to the reaction* ; and this other, which is a consequence from it, *the angle of reflection is equal to the angle of incidence*. I shall not stop to demonstrate in how many cases these axioms are erroneous ; how many actions in Nature are without reactions ; how many actions have unequal reactions ; how many angles of reflection are deranged by the very planes of incidence. It is sufficient for me, at present, to repeat what I have already, oftener than once, advanced, namely, that the weakness of the human mind, and the vanity of our education, are incessantly prompting us to generalize. This mode of proceeding is the source of all our errors, and perhaps, of all our vices. Nature bestows on every being that which is adapted to it, in the most perfect conformity, according to the Latitude for which it is destined ; and when the temperature of that Latitude is affected by change of seasons, she is pleased to vary, likewise, the adaptations. Some of those adaptations are, accordingly, immutable, and others variable.

Nature frequently employs contrary means for producing the same effect. She makes glass with fire ; she makes it, too, with water, the crystal for instance : Farther, she produces it from animal organization, such as certain transparent shell fish. She forms the diamond by a process to us utterly unknown. Conclude now, because a body has been vitrified, it must certainly be by the effect of fire, and rear on this perception the system of the Universe ! The utmost that we are capable of doing is to catch some harmonic instants in the existence of beings. That which is vitrifiable becomes calcareous, and what is calcareous changes into glass, by the action of the same

fire. Deduce then, from these simple modifications of the fossil kingdom, invariable characters for determining the general classes of it !

On the other hand, Nature frequently employs, also, the same means, for producing effects directly contrary. For example, we have seen that, in order to increase the heat over the lands of the North, and to mitigate it over those of the South, she made use of opposite colours ; she produces in both the same effects, by covering the face of the one and of the other with rocks. These rocks are essentially necessary to vegetation. I have frequently remarked, in those of Finland, stripes of verdure skirting their bases to the South ; and in those of the Isle of France, I have seen such verdant stripes on the side averted from the Sun.

The same observations may be made in our own climate. In Summer, when every thing is parched, we frequently find green herbage under walls which have a northerly aspect ; it disappears in Winter ; but then we find it replaced in front of eminences which face southward.

We have already remarked, that the icy Zones, and the Torrid Zone, contain the greatest quantity of waters, the evaporation of which equally tempers the violence of the heat and of the cold, with this difference, that the greatest lakes are toward the Poles, and the greatest rivers toward the Line. There are, it is admitted, some lakes in the interior of Africa and of America ; but they are placed in elevated atmospheres, in the centre of mountains, where they are not liable to corruption from the action of the heat ; but the plains and low grounds are washed by the greatest currents of living water that are in the World, such as the Zaire, the Senegal, the Nile, the Mississippi, the Oroonoko, the Amazon and others.

Nature proposes to herself, universally, only the accommodation of beings possessed of sensibility. This remark is all important in the study of her Works ; otherwise,

from the similitude of the means which she employs, or the exceptions from them, we might be tempted to doubt of the consistency of her Laws, instead of ascribing the majestic obscurity which pervades them, to the multiplicity of her resources, and to the profundity of our own ignorance.

This Law of adaptation and conformity has been the source of all our discoveries. It was this which waisted *Christopher Columbus* to America ; because as *Herrera* tells us,* he thought, contrary to the opinion of the Ancients, that the whole five Zones must be inhabited, as GOD had not formed the Earth to be a desert. It is this Law which regulates our ideas respecting objects absolutely beyond the reach of our examination. By means of it, though we are ignorant whether there may be men in the Planets, we are assured there must be eyes, because there is light. It is this which has awakened a sense of Justice in the heart of every man, and informs him that there is another order of things after this life is at an end. This Law, in a word, is the most irresistible proof of the existence of GOD ; for amidst such a multitude of adaptations so ingenious, that our passions themselves, restless as they are, never could have devised any thing similar ; and so numerous, that every day is presenting to us some that have all the merit of novelty, the first of all, which is the DEITY, must undoubtedly exist, as He is the general conformity of all particular conformities.

It is this, above all, whose existence we endeavour, even involuntarily, every where to trace, and to assure ourselves of it in every possible manner. And this explains to us the reason why the most splendid and comprehensive collections in Natural History, Galleries of the choicest masterpieces in Painting, Gardens filled with the rarest and most curious plants, Libraries stored with the most valuable and best written books ; in a word, every thing

* *Herrera's History of the Westindies*, Book i. chap. 2.

that presents to us the most marvellous relations of Nature, after having raised us to an extasy of admiration, conclude by superinducing languor and fatigue. We frequently prefer to all these a rustic mountain, a rugged rock, some wild solitude, which might present to us relations newer, and still more direct.

How often, on coming out of the King's magnificent Cabinet of Natural History, do we stop mechanically to look at a gardener digging a hole in the field with his spade, or at a carpenter hewing a piece of timber with his hatchet? It looks as if we expected to see some new harmony start out of the bosom of the Earth, or burst from the side of a lump of oak. We set no value on those which we have just been enjoying, unless they lead us forward to others, which as yet we do not know. But were the complete History given us of the stars of the Firmament, and of the invisible Planets which encircle them, we should perceive in them a multitude of ineffable plans of intelligence and goodness, after which the heart would continue fondly to sigh: Its last and only end is the DIVINITY himself.

STUDY TENTH.

APPLICATIONS OF SOME GENERAL LAWS OF NATURE TO PLANTS.

BEFORE I proceed to speak of plants, I must be indulged in making a few reflections on the language of Botany.

We are still so young in the study of Nature, that our languages are deficient in terms to express her most common harmonies. This is so true, that however exact the descriptions of plants may be, and compiled by Botanists of whatever ability, it is impossible to distinguish them in the fields, unless you have previously seen them in Nature, or, at least, in an herbarium. Persons, who think they have made the greatest proficiency in Botany, need only attempt to draw on paper a plant which they have never seen, after the description of the most accurate Master, to be convinced how widely the copy deviates from the original.

Men of genius have, nevertheless, taken inexpressible pains to assign characteristic names to the different parts of plants. They have even borrowed most of those names from the Greek, a language of singular energy of expression. From this has resulted another inconveniency; it is, that those names, being for the most part compounds, cannot be rendered into modern language; and for this reason it is that a great part of the Works of *Linnaeus* are absolutely incapable of translation. These learned and

mysterious expressions, no doubt, diffuse a venerable air over the study of Botany; but Nature has no need of such resources of human art to attract our respect. The sublimity of her Laws can easily dispense with the emphasis and obscurity of our expressions. The more light a man carries in his own bosom, the more wonderful he esteems it to be.

After all, most of those foreign names, employed particularly by the herd of Botanists, do not so much as express the most common characters of vegetables. They frequently make use, for example, of such vague expressions as these, *suavè rubente*, *suavè olente*, of an agreeable red, sweet smelling, in order to characterize flowers; without expressing the shade of red, or the species of perfume. They are still more embarrassed, when they wish to convey the dusky colours of the stem, of the root, or of the fruit: *Atro rubente*, say they, *fusco nigrescente*, of a dark red, of a dusky brown. As to the forms of vegetables, the case is still worse, though they have fabricated terms compounded of four or five Greek words to describe them.

J. J. Rousseau communicated to me, one day, a set of characters somewhat resembling the algebraic, which he had invented for the purpose of briefly expressing the colours and forms of vegetables. Some of them represented the forms of the flowers; others, those of the leaves; others, those of the fruits. Some resembled a heart, some were triangular, some of the lozenge shape. He did not employ above nine or ten of those signs, to compose the expression of one plant. Some he placed above others, with cyphers which indicated the genera and the species of the plant, so that you would have taken them for the terms of an algebraic formula. However ingenious and expeditious this method might be, he informed me that he had given it up, because it presented to him skeletons only.

This sentiment came with peculiar grace from a man whose taste was equal to his genius, and may suggest some reflections to those who are for giving abridgments of every thing, especially of the Works of Nature. The idea of *John James*, however, well deserves to be followed up, should it only serve to produce, one day, an alphabet proper to express the language of Nature. All that seems requisite is the introduction of accents, to convey the shades of colours, and all the modifications of flavours, perfumes and forms. After all, those characters could not be delineated with perfect precision, unless the qualities of each vegetable are first exactly determined by words: Otherwise the language of Botanists, which is now accused of speaking only to the ear, would make itself intelligible only to the eye.

This is what I have to propose respecting an object so highly interesting, and which will perfectly coalesce with the general principles which we shall afterwards lay down. The little which I may advance on the subject will serve to supply expression, not only in Botany, and in the study of the other natural Sciences, but in all the Arts, where we find ourselves puzzled every instant, for want of terms to convey the shades and forms of objects.

Though we have only the term *white*, whereby to express the colour which bears that name, Nature presents to us a great variety of sorts of it. Painting, with respect to this article, is as barren as language.

I have been told of a famous Painter of Italy, who, upon a certain occasion, found himself very much embarrassed how to represent, in one of his pieces, three figures dressed in white. The point in question was, to give effect to those figures, to be thus uniformly dressed, and to draw out different shades of the most simple, and the least compounded, of all colours. He was going to abandon his object as a thing impossible, when, happening to pass through a corn market, he perceived the effect which he was in quest of. It was a group formed by three millers,

one of whom was under a tree, the second in the half tint of the shade of that tree, and the third exposed to the rays of the Sun : So that though the drapery of all the three was white, they were completely detached from each other. He introduced a tree, therefore, amidst the three personages of his picture, and, by illuminating one of them with the rays of the Sun, and throwing over the other two different tints of shade, he was enabled to exhibit a drapery of three several casts of white.

This, however, was rather to elude the difficulty, than to resolve it. And this is, in fact, what Painters do in similar cases. They diversify their whites by shades, half tints and reflexes ; but these whites are not pure ; they are always disturbed with yellow, blue, green or gray. Nature employs several species of white, without diminishing the purity of it, by dotting, rumpling, radiating, varnishing it, and in various other ways.....Thus, the whites of the lily, of the daisy, of the lily of the valley, of the narcissus, of the anemone nemorosa, of the hyacinth, are all different from each other. The white of the daisy has something of that of a shepherd's cornet ; that of the hyacinth has a resemblance of ivory ; and that of the lily, half transparent and chrySTALLINE, resembles the paste of porcelain. I believe, therefore, that all the whites, produced by Nature, or by Art, might be referred to those of the petals of our flowers. We should thus have, in vegetables, a scale of shades of the purest white.

We might, in like manner, procure all the pure and imaginable shades of yellow, of red and of blue, from the flowers of the jonquil, of the saffron, of the butter flower of the meadow, of the rose, of the poppy, of the blue bottle, of the cornfield, of the larkspur and so on. We might find, in the same manner, among our common flowers, all the compound shades, such as those of the impurpled violet and foxglove, which are formed of the various harmonies of red and blue. The single compound colour, made up of blue and yellow, which constitutes the green of our

herbage, is so varied in every plain, that each plant, I may venture to affirm, has its peculiar shade of that colour. I can have no doubt that Nature has displayed, in equal variety, the other colours of her palette, in the bosom of flowers, or on the surface of fruits.

In performing this, she sometimes employs very different tints, without confounding them; but she lays them on one above another, so that they form the dove's neck: Such is the beautiful shag which garnishes the corola of the anemone; in other cases, she glazes their surface, as certain mosses with a green ground, which are glazed over with purple; she velvets others, such as the pansy; she powders over some fruits with a delicately fine flour, such as the purple plumb, distinguished by the addition of *de Monsieur*; or invests them with a light down to soften their vermillion, as the peach; or smooths their skin, and gives the brightest lustre to their colours, as to the red of the apple of Calleville.

What embarrasses Naturalists the most, in denominating colours, is to find distinctive epithets for such as are dusky; or rather, this gives them no manner of concern: For they evade the difficulty by the vague and indecisive expressions, of blackish, gray, ash coloured, brown, which they convey, it is true, in Greek and Latin words. But those words frequently answer no purpose, except to confound their images, by giving no representation whatever; for what, in good earnest, is meant by these, and such like epithets, *atro purpurante*, *fusco nigrescente*, which they employ so frequently?

It is possible to make thousands of tints widely different from each other, to which such general expressions might be applied. As those dark shades, in truth, are much compounded, it is exceedingly difficult to characterize them by the phraseology of our common vocabularies. But this might be easily and effectually accomplished, by referring them to the different colours of our domestic vegetables. I have remarked in the barks of our trees and

shrubby, in the capsules and shells of their fruits, as well as in the dead leaves, an incredible variety of those sad and gloomy shades, from yellow down to black, with all the intermixtures and accidents of the other colours. Thus, instead of saying in Latin, a yellow inclining to black, or an ash coloured tint, in order to determine some particular shade of colour in a production of Art, or of Nature, we might say a yellow of the colour of a dried walnut, or a gray like the bark of a beech tree.

Those expressions would be so much the more exact, that Nature invariably employs such tints in vegetables, as determining characters and indications of maturity, of vigor, or of decay; and that our peasantry can distinguish the different species of wood in the forests by inspection of their bark simply. Thus, not Botany alone, but all the Arts, might find, in vegetables, an inexhaustible dictionary of unvarying colours, which would not be embarrassed with barbarous and technical compound words, but which would continually present new images. Our books of Science would thence derive much pleasing vivacity, from being embellished by comparisons and expressions borrowed from the loveliest kingdom of Nature.

The great Poets of Antiquity carefully availed themselves of this, by referring most of the events of human life to some appearance of the vegetable kingdom. Thus *Homer* compares the fleeting generations of feeble mortals to the leaves which drop from the trees of the forest, at the end of Autumn; the freshness of beauty to that of the rose; and the paleness which overspreads the countenance of a young man wounded to death in battle, as well as the attitude of his drooping head, to the colour and the fading of a lily, whose root has been torn up by the plough. But we satisfy ourselves with repeating the expressions of men of genius, without daring to tread in their footsteps. This, however, is not the worst, for most Naturalists consider the colours themselves of vegetables as accidents simply. We shall presently see under what a grievous

mistake they labour, and how widely they have deviated from the sublime plans of Nature, by persisting in a prosecution of their mechanical and systematic methods.

It is possible, in like manner, to trace an approximation of savours and smells of every species, and of every country, to those of the plants of our gardens and of our fields. The ranunculus of the meadow has the acridity of the Java pepper. The root of the caryophyllata, or holy thistle, and the flower of the pink, smell like the clove of Amboyna. As to compound savours and smells, they may be referred to such as are simple, the elements of which Nature has scattered over all climates, and which she has united in the class of vegetables. I know a species of morel, used as food by the Indians, which, when boiled, has the taste of beef. They call it *brette*. There is a species of the cranesbill, the leaf of which resembles, in smell, a roasted leg of mutton. The muscari, a species of small hyacinth, which grows among shrubbery early in the Spring, smells very strongly of the plumb. Its small monopetalous flowers, of a delicate blue colour, and with lips or incisions, have likewise the form of that fruit.

By approximations such as these, the English Navigator *Dampier*, and Father *du Tertre*, have given us, as far as I can judge, the most accurate notions of the fruits and flowers which grow between the Tropics, by referring them to the fruits and flowers of our own climates. *Dampier*, for example, in order to describe the banana, compares it, when stripped of its thick five panned skin, to a large sausage; its substance and colour to fresh butter in Winter; its taste, a mixture of apple and of the pear known by the name of the good christian, which melts in the mouth like marmalade. When this traveller describes some good fruit of the Indies, he sets your mouth a watering. He possesses a naturally sound understanding, superior, at once, to the methodical trammels of the learned, and to the prejudices of the vulgar. He maintains, for instance, and with truth on his side, in opposition to the

opinion of most navigators, that the plantain, or banana, is the king of fruits, without excepting even the cocoa. He informs us, that this is likewise the opinion of the Spaniards, and that multitudes of families live, between the Tropics, on this pleasant, wholesome, and nourishing fruit, which lasts all the year round, and stands in no need of any of the arts of cookery.

Father *du Tertre* is not less happy, nor less accurate, in his botanical descriptions. These two travellers give you, at a single stroke, by means of trivial similitudes, a precise idea of a foreign vegetable, which you would search for to no purpose in the Greek names of our first rate Botanists. This mode of describing Nature, by ordinary images and sensations, is held in contempt by the learned; but I consider it as the only one capable of exhibiting pictures, that have a resemblance, and as the true character of genius. With such assistance, you will be enabled to paint every natural object, and may dispense with methods and systems; without it you will only coin phrases.

Let us now suggest a few thoughts respecting the form of natural objects. It is here that the language of Botany, and even those of the other Arts, are peculiarly barren. Geometry, whose particular object this is, has invented scarcely more than a dozen of regular curves, which are known to only a small number of the learned; and Nature employs an infinite multitude of them in the forms of flowers alone. Some of the uses of these we shall presently indicate. Not that I mean to make of a study prolific of delight, a sublime Science, worthy only of the genius of a *Newton*. As Nature has introduced, in my opinion, not only the colours, the flavours and the perfumes, but likewise every model of form into the leaves, the flowers and the fruits of all climates, whether in trees, in herbage, or in mosses; the vegetable forms of other parts of the World, might be referred to those of our own country which are most familiar to us. Such approximations would be much more intelligible than Greek com-

pound words, and would manifest new relations in the different classes of the same kingdom.

They would be no less necessary for expressing the aggregations of the flowers on their stems, of the stems round the root, and the groups of young plants around the parent plant. It may be affirmed, that the names of most of these vegetable aggregations and dispositions are yet to be invented; the greatest Masters not having been fortunate in characterizing them, or, to speak without reserve, not having made it any part of their study. For example, when *Tournefort** speaks, in his Voyage to the Levant, of a heliotrope of the Isle of Naxos, which he characterizes thus, *heliotropum humifusum, flore minimo, semine magno*, the creeping heliotrope, with a very small flower and a large seed; he says that it has its flowers disposed in form of an ear of corn, going off in a scorpion's tail. There are two mistakes in this description; for the flowers of this heliotrope, similar, from their aggregation, to the flowers of the heliotrope of our climates, and to that of Peru, are not disposed in form of an ear of corn, for they are arranged on a horizontal stem, and only on one side; and they bend downward, like the tail of a snail, and not upward, like the tail of a scorpion.

The same inaccuracy, in respect of image, is to be found in the description which he gives us of the *stachis Cretica latifolia*, the broad leaved stachis of Crete: Its flowers, says he, are disposed in rings. No one can imagine he intends to convey this meaning, that they are disposed like the divisions of the king of the chess board. Under this form, however, they are represented in the drawing of *Aubriet*, his designer. I do not know any botanic expression which conveys this character of spherical aggregations, in separate stories of alternate swellings and sinkings, and terminating in a pyramid. *Barbeau du Bourg*, who possesses much imagination with little exactness, calls

* *Tournefort's Voyage to the Levant*, vol. i.

this form verticillate, for what reason I know not. If it is from the Latin word *vertex*, head or summit, because these flowers, thus aggregated, form several summits, this denomination would be more applicable to several other plants; and, besides, does not express the swellings, the sinkings, and the progressive diminution of the flowers of the stachis.

Tournefort derives it from the Latin word *verticillus*; that is, says he, a small weight perforated circularly to receive the end of a spindle, in order to make it whirl with greater facility. This is going a great way, in quest of a very imperfect similitude, to an utensil by no means generally known. In saying this, however, I would not be considered as failing in the respect which is due to such a man as *Tournefort*, who first cleared for us the botanic path, and was, besides, a person of profound erudition. But from this carelessness of the great Masters, we may form a judgment of the vague, inaccurate, and incoherent expressions which fill the vocabulary of Botany, and diffuse obscurity over its descriptions.

After all, I shall be asked, How would you characterize the aggregation of the flowers of the two plants which have just been mentioned? By referring them to aggregations similar to those of the plants of our climates. In this there can be no difficulty: Thus, for example, we might refer the assemblage of the flowers of the Grecian heliotrope, to that of the French, or Peruvian heliotrope: And that of the flowers of the Cretan stachis, to that of the flowers of the horehound, or of the pennyroyal. To this might afterwards be added the differences in colour, smell, flavour, which diversify the species of it. There is no occasion to compound foreign terms to describe forms which are familiar to us. Nay, I defy any one to convey by Greek and Latin words, and with the most learned turn of periphrasis, the simple colour of a bark of a tree. But if you tell me it resembles that of an oak; I have the shade of it at once.

These approximations of plants have this farther utility, that they present us with the combined whole of an unknown object, without which we can form no determinate idea of it. This is one of the defects of Botany, it exhibits the characters of vegetables only in succession; it does not collect them, it decomposes them. It refers them, indeed, to a classical order, but not to an individual order. This, however, is the only one which the weakness of the human mind permits us to catch. We love order, because we are feeble, and because the least confusion disturbs us; now, there is no order which we can adopt more easily than that which approaches to an order which is familiar to us, and which Nature is every where presenting. Try to describe a man, feature by feature, limb by limb; be ever so exact, yet you never will be able to give me his portrait: But if you refer him to some known personage; if you tell me, for example, that he is of the make and mien of a Don Quixote; or with a nose like that of St. *Charles Baromeo*, and so on, and you paint me his picture in four words. It is to the whole of an object that the ignorant, an epithet which includes the greatest part of Mankind, attach themselves in the first instance, in order to acquire the knowledge of it.

It would, therefore, be of essential importance to have, in Botany, an alphabet of colours, flavours, smells, forms, and aggregations, derived from our most common plants. Those elementary characters would enable us to express ourselves exactly in all the parts of Natural History, and to present to ourselves relations equally new and curious.

In hope that persons of superior intelligence may hereafter be induced to take up the subject, I proceed to the discussion of it with what ability I have, notwithstanding the embarrassment of language.

When we see a multitude of plants, of different forms, vegetate on the same soil, there is a disposition to believe, that those of the same climate grow indifferently every where. But those only which are produced in places,

particularly assigned to them by Nature, attain there all the perfection of which they are susceptible. The same thing holds good with respect to animals. Goats are sometimes reared in marshy places, and ducks on the mountains; but the goat never will acquire, in Holland, the beauty of that which Nature clothes with silk on the rocks of Angora; nor will the duck of Angora ever attain the stature and the colours of those which are to be found in the canals of Holland.

If we throw a simple glance on plants, we shall perceive that they have relations to the elements which promote their growth; that they have relations to each other, from the groups which they contribute to form; that they have relations to the animals which derive nourishment from them; and, finally, to Man, who is the centre of all the Works of Creation. To these relations I give the name of harmonies, and I divide them into elementary, into vegetable, into animal and into human.

By proposing this division, I shall reduce to something like order the disquisition on which I am going to enter. It cannot be supposed that I should examine them in detail: those of a single species would furnish speculations, which the application of a whole life could not exhaust; but I shall unfold enough of their general harmonies to produce conviction, that an infinite Intelligence reigns in this amiable part of Creation, as in the rest of the Universe.

We shall thus make application of the Laws which we have previously established, and shall take a glimpse of a multitude of others, equally worthy of research, and equally calculated to excite admiration. Reader, be not astonished at either their number, or their extent. Let this great truth be deeply impressed on thy heart: *GOD has made nothing in vain!* A scholar, with his systems and methods, finds himself stopped short in nature every step he takes; while furnished with this as a key, the ignorant rustic is able to unlock every door of knowledge.

ELEMENTARY HARMONIES OF PLANTS.

Plants have as many principal parts as there are elements with which they keep up a relation. By their flowers, they stand related to the Sun, which fecundates their seeds, and carries them on to maturity; by their leaves, they are related to the waters, which bedew them; by their stems, to the winds which agitate them; by their roots, with the ground which sustains them; and by their grains, with their situations adapted to their growth and increase. Not that these principal parts have no indirect relations besides to the other elements, but it will be sufficient for our purpose to dwell on such as are immediate.

Elementary Harmonies of Plants with the Sun, by the Flowers.

Though Botanists may have made great and laborious researches respecting plants, they have paid no attention to any of those relations. Fettered by their systems, they have attached themselves to the consideration of them, particularly on the side of the flowers: and have arranged them in the same class, wherever they found these external resemblances without so much as enquiring what might be the particular use of the florification. They have, indeed, distinguished in it the stamina, the antheræ, and the stigmata, for the fecundation of the fruit, but, excepting this, and some others, which respect the interior organization, they have neglected, or misunderstood, the relations which the whole plant has with the rest of Nature.

This partial division has led them into the strangest confusion; for, by considering the flowers as the princi-

pal characters of vegetation, and by comprehending in the same class those which were similar, they have united plants entirely foreign to each other, and have separated, on the contrary, many which are evidently of the same genus. Such is, in the first case, the fuller's thistle, called *dipsacus*, which they class with the scabious, because of the resemblance of some parts of its flower; though it presents in its branches, its leaves, its smell, its seed, its prickles, and the rest of its qualities, a real thistle: And such is, in the second, the great chesnut of India, which they exclude from the class of chesnut trees, because it has different flowers. To class plants from the flowers, that is, from the parts of their fecundation, is the same thing with classing animals from those of generation.

However, though they have referred the character of a plant to its flower, they misunderstand the use of its most shining part, which is that of the corolla. They call that the corolla, which is, in common language, denominated the leaves of a flower. It is a Latin word, signifying a little crown, from the disposition of the leaves, in many species, in the form of coronets, and they have given the name of petals to the divisions of that crown. Some, in truth, have acknowledged it to be properly adapted for covering the parts of fecundation before the expansion of the flower; but its calix is much better adapted to this purpose, from its thickness, from its beards, and sometimes from the prickles with which it is invested. Besides, when the corolla leaves the stamina exposed, and when it continues fully blown for whole weeks, it must of necessity be answering some other purpose; for Nature does nothing in vain.

The corolla seems intended to reverberate the rays of the Sun on the parts of fecundation; and we shall be put beyond the reach of doubt as to this, if we consider the colour and the form of it in most flowers. It has been remarked in the preceding Study, that of all colours, white is the most proper for reflecting the heat; Now, it

is, in general, that which Nature bestows on the flowers that blow at cold seasons and in cold places, as we see is the case in the snow drop, the lily of the valley, the hyacinth, the narcissus, and the anemone nemerosa, which come into flower early in the Spring. We must likewise assign to this colour such as have slight shades of the rose and of the azure, as many hyacinths; as well as those which have yellow and shining tints, as the flowers of the dandelion, the butter flower of the meadow, and the wall gillyflower. But such as blow at warm seasons, and in warm situations, as the cockle, the wild poppy, and the blue bottle, which grow in Summer amongst the corn, are dressed in strong colours, such as purple, deep red, and blue; for these absorb the heat without greatly reflecting it.

I do not know, however, that there are any flowers entirely black; for in that case, its petals, destitute of all power of reflection, would be entirely useless. In general, of whatever colour a flower may be, the under part of its corolla, which reflects the rays of the Sun, is of a much paler tint than the rest. This is so very remarkable, that Botanists, who generally consider the colours of flowers as accidents merely, distinguish it by the name of *unguiculus* (a little nail.) The unguicle is that with relation to the flower which the belly is with relation to animals: Its shade is always clearer than that of the rest of the petal.

The forms of flowers are no less adapted than their colours to reflect the heat. Their corollæ, divided into petals, are only an assemblage of mirrors directed toward one focus. Of these they have sometimes four, which are plain, as the flower of the colewort in the cruciform; or a complete circle, as the daisy in the class of radiated; or spherical portions, as the rose; or entire spheres, as the bells of the lily of the valley; or cones mutilated, as the foxglove, the corolla of which is formed like a sewing thimble.

Nature has placed, at the focuses of these, plain, spherical, elliptical, parabolic, and other mirrors, the parts of

the fecundation of plants, as she has placed those of generation in animals, in the warmest parts of their bodies. These curves, which Geometricians have not yet examined, merit their most profound researches. Is it not astonishing, that they should have bestowed such learned pains to find out curves altogether imaginary, and frequently useless; and that they should have neglected to study those which Nature employs so regularly, and in such variety, in an infinite number of objects? Be this as it may, Botanists have given themselves still less trouble about the matter. They comprehend those of flowers under a small number of classes, without paying the slightest attention to their use, nay, without so much as apprehending that they could have any. They confine themselves entirely to the division of their petals, which frequently change nothing of the configuration of their curves; and they frequently class under the same name those which are the most opposite. Thus, under the general designation of the *monopetalous*, (those that have a single petal) they include the spheroid of the lily of the valley, and the trumpet of the convolvulus.

On this subject, a very remarkable circumstance claims our notice; namely, that, frequently, such as is the curve formed by the border, or upper extremity of the petal, such too is the plan of the whole petal itself; so that Nature presents to us the cut or shape of each flower in the contour of its petals, and gives us at once, its plan and its elevation. Thus roses, and the whole tribe bearing this denomination, have the border of their petals in sections of a circle, like the curve of the flowers themselves; the pink and blue bottle, which have their sel-vage notched, present the plans of their flowers plaited up like fans, and form a multitude of focuses.

For want of the real flower, these curious remarks may be verified from the drawings of Painters who have been the most exact in copying plants, but who are indeed very few in number. Such is, among those few, *Aubriet*, who

has drawn the plants of *Tournefort's* voyage to the Levant,* with the taste of a Painter, and the precision of a Bòtanist. You may there see the confirmation of what I have just been advancing. For example, the *scorzonera Græca saxatilis* & *maritima foliis variè laciniatis*, (the Greek saxatile and marine scorzonera, with leaves variously scolloped) which is there represented, as its petals, or half flowers, squared at the extremity, and plane in their surface. The flower of the *stachis Cretica latifolia*, (the broad leaved stachis of Crete) which is a monopetalous tubular plant, has the upper part of its corolla undulated, as well as its tube. The *campanula Græca saxatilis jacobææ foliis*, (the Greek bell flower of the rocks, with ragwort leaves) presents these consonances in a manner still more striking. This campanula, which *Tournefort* considers as the most beautiful he had ever seen, and which he sowed in the Royal Garden at Paris, where it succeeded very well, is of the pentagonal form. Each of its faces is formed of two portions of a circle, the focuses of which, undoubtedly, meet on the same anthera; and the border of this campanula is notched into five parts, each of which is likewise cut into the form of a Gothic arch, as each subdivision of the flower is. Thus, in order to know, at once, the curve of a flower, it is sufficient to examine the brim of its petal.

It is of much utility to attend to this observation, for otherwise it would be extremely difficult to determine the focuses of the petals. Besides, flowers lose their internal curves in herberies. I believe these consonances to be general; I presume not however, to assert, that they admit of no exceptions. Nature may deviate from this order, in some species, for reasons which I know not. It cannot be too frequently repeated; She has no general and unvarying Law, except the accommodation of beings endowed with sensibility. The relations just now suggest-

* *Tournefort's Voyage to the Levant*, vol. i.

ed, between the curve of the brim and that of the petals, seem, beside, to be founded on this universal Law, as they present conformities of such agreeable approximation.

The petals appear to such a degree destined to warm the parts of fecundation, that Nature has placed a circle of them around most compound flowers, which are themselves aggregations of small tubes, infinite in number, that form so many particular flowers, or, if you will, flowrets. This is obviously remarkable in the petals which surround the disks of daisies and sunflowers. They are likewise to be met with around most of the umbelliferous plants : Though each flowret, which composes them, has its particular petals, there is a circle of others still greater, which encompasses their assemblage, as you may see in the flowers of the daucus.

Nature has still other means of multiplying the reflexes of heat in flowers. Sometimes she places them on stems of no great elevation, in order to collect warmth from the reflections of the Earth ; sometimes she glazes over their corollæ with a shining varnish, as the yellow meadow ranunculus, known by the trivial name of butter flower. Sometimes she withdraws the corolla, and makes the parts of fecundation to shoot from the partition of an ear, of a cone, or of the branch of a tree. The forms of the spike, and of the cone, appear to be the best adapted for reverberating on them the action of the Sun, and to ensure their fructification ; for they always present some one side or another sheltered from the cold. Nay, it is very remarkable, that the aggregation of flowers, in a conical and spike form, is very common to herbs and to trees of the North, and rarely to be found in those of the South. Most of the gramineous plants which I have seen in southern Countries, do not carry their grains in a spike, or closely compacted ear, but in flowing tufts, and divided into a multitude of particular stems, as the millet and rice. The maize, or Turkey corn, I admit, bears its grains in a large ear ; but that ear is for a considerable time shut up in a

bag ; and on bursting from it, pushes away over its head a long covering of hair, which seems entirely destined to the purpose of sheltering its flowers from the heat of the Sun.

Finally, what confirms me in the belief, that the flowers of plants are adapted to the action of heat, conformably to the nature of every climate, is this, that many of our European plants vegetate extremely well in the Antilles Islands, but never come to seed there. Father *du Tertre* observed, that in those islands,* the cabbage, the fainfain, the lucern, the favory, the sweet basil, the nettle, the plantain, the wormwood, the sage, the liverwort, the amaranth, and all our species of gramineous plants, throve there wonderfully well, but never produced grains. These observations demonstrate, that it is neither the air, nor the soil, which is inimical to them ; but the Sun, which acts with too much vivacity on their flowers, for most of these plants have theirs aggregated into an ear, which greatly increases the repercussion of the solar rays.

I believe, at the same time, that such plants might be naturalized in the Westindia Islands, as well as many others of our temperate climates, by selecting from the varieties of their species, those whose flowers have the smallest fields, and whose colours are the deepest, or those whose pannicles are divergent.

Not that Nature has no other resources except such as these, to make plants of the same genus attain perfection in different seasons and climates. She can render their flowers capable of reflecting the heat, in different degrees of Latitude, without any very sensible alteration of the form. Sometimes she mounts them on elevated stems, to remove them from the influence of the reflection of the ground. It is thus she has placed, between the Tropics, most of the apparent flowers upon trees. I have seen but few there in the meadows, but a great many in the forests.

* Natural History of the Antilles, by Father *du Tertre*.

In those countries, you must look aloft, in order to have a sight of flowers ; in our native climes, we must cast our eyes on the ground, for this purpose ; for with us flowers grow on herbage and shrubbery. Sometimes she expands them under the shade of leaves ; such are those of the palm tree, of the banana, and of the *jacquier*, which grow close to the trunk of the tree. Such, likewise, are, in our temperate climates, those large white bell formed flowers, known by the name of Lady's smock, which delight in the shade of the willow.

There are others, such as most part of the convolvuluses, which expand only in the night ; others grow close to the ground, and exposed, as the pansy, but their drapery is dusky and velveted. There are some which receive the action of the Sun when at a considerable height, as the tulip ; but Nature has taken her precautions so exactly, as to bring out this stately flower only in the Spring, to paint its petals with strong colours, and to daub the bottom of its cup with black.* Others are disposed in giran-

* This flower, from its colour, is, in Persia, the emblem of perfect lovers. *Chardin* tells us, that, when a young Persian presents a tulip to his mistress, it is his intention to convey to her this idea, that, like this flower, he has a countenance all on fire, and a heart reduced to a coal. There is no one Work of Nature, but what awakens in man some moral affection. The habits of society insensibly efface, at length, the sentiment of it ; but we always find it in vigor among Nations who still live near to Nature.

Many alphabets have been imagined in China, in the earlier ages, after the wings of birds, fishes, shells and flowers : Of these, very curious characters may be seen in the China illustrated of Father *Kercher*. It is from the influence of those natural manners, that the Orientals employ so many similitudes and comparisons in their languages. Though our metaphysical eloquence makes no great use of them, they frequently produce, nevertheless, a very striking effect. *J. J. Rousseau* has taken notice of that which the Ambassador of the Scythians proposed to *Darius*. Without speaking a word, he presented him with a bird, a frog, a mouse and five arrows.† *Herodotus* relates, that the same *Darius* sent word to the Greeks of Ionia,

† *Darius*, at first, understood this as a complete surrender of Scythian independence into his hands ; but the event instructed him, that this high spirited people intended to convey a bold defiance : “ Unless you can fly as a bird, dig as a mouse, swim as a frog, our arrows shall reach you.”

doles, and receive the effect of the solar rays only under one point of the compass. Such is the girandole of the lilach, which pointing with various aspects, to the East, to the South, to the West and to the North, presents, on the same cluster, flowers in bud, half open, fully blown, fading, and all the delightful shades of the florification.

There are flowers, such as the compound, which being in a horizontal position, and completely exposed, behold the Sun, like the Horizon itself, from his rising to his setting ; of this description is the flower of the dandelion. But it possesses very peculiar means of sheltering itself from the heat : It closes entirely whenever the heat becomes excessive. It has been observed to open, in Summer, at half an hour after five in the morning, and to collect its petals toward the centre, about nine o'clock. The flower of the garden lettuce, which is, on the contrary, in a vertical plane, opens at seven o'clock, and shuts at ten.

From a series of similar observations it was, that the celebrated *Linnaeus* had formed a botanical time piece ; for he had found plants which opened their flowers at every hour of the day, and of the night. There is cultivated in the King's Garden, at Paris, a species of serpentine aloes, without prickles, whose large and beautiful flower exhales a strong odour of the vanilla, during the time of its expansion, which is very short. It does not blow till toward the month of July, and about five o'clock in the evening : You then perceive it gradually open its petals, expand them, fade and die. By ten o'clock of the same night, it is totally withered, to the great astonishment of the spectators, who flock in crowds to the sight ; for what

who were laying waste the country, that if they did not give over their depredations, he would treat them like pines. The Greeks, who by this time had become infected with wit, and had proportionally begun to lose sight of Nature, did not comprehend the meaning of this. Upon enquiry, they at length discovered that *Darius* meant they should understand it to be his resolution utterly to exterminate them ; for the pine tree, once cut down, shoots out again no more.

is uncommon is alone admired. The flower of our common thorn, I do not mean that of the white thorn, is still more extraordinary ; for it flowers so rapidly, that there is scarce time to observe its expansion.

These observations, taken in their connexion, clearly demonstrate the relations of the corollæ to the heat of the Sun. To all those which have gone before, I shall subjoin one more, by way of conclusion, which evidently proves the use for which they are intended ; it is this, The duration of their existence is regulated by the quantity of heat which it is their destination to collect. The hotter it is, the shorter is their duration. They almost all drop off as soon as the plant is fecundated.

But if Nature withdraws the greatest number of flowers from the too violent action of the Sun, she destines others to appear in all the lustre of his rays, without sustaining the least injury from them. On the first she bestows dusky reflectors, or such as can close themselves as occasion requires ; she provides others with parasols. Such is the crown imperial, whose flowers, like a bell inverted, grow under the shade of a tuft of leaves. The chrysanthemum peruvianum, or to employ a better known term, the turnsol, which turns continually toward the Sun, covers itself, like Peru, the country from which it comes, with dewy clouds, which cool and refresh its flowers, during the most violent heat of the day. The white flower of the lychnis, which blows in our fields, in Summer, and presents, at a distance, the resemblance of a Maltese cross, has a species of contraction, or narrow collar, placed at its centre, so that its large shining petals turned back outwardly, do not act upon its stamina. The white narcissus has, in like manner, a small tunnel. But Nature stands in no need to create new parts, in order to communicate new characters to her Works. She deduces them, at once, from existence and from nonexistence ; and renders them positive, or negative, at her pleasure. She has given curves to most flowers, for the purpose of collecting the

REVERBERATING FLOWERS

5. In Arcuated
Plane

6. Or Parabolic

1. Elliptic

3. Spheræ

2. Conic

1. Perpendicular

1. The Tulip

3. The Simple Rose

2. Convolutus of the Day

1. Ear of Corn

3. The Daisy

6. The Nip
of Peas



10. The Superst

9. The Blossom

8. Convolutus of the Night

7. Ear of Rice

11. In unequal Plane

10. In the Ellipse inverted

9. In the Sphere colored towards

8. In a Cone colored

7. Divergent

PARASOL FLOWERS

heat at their centre : She employs the same curves, when she thinks proper, in order to dissipate the heat : She places the focuses of them so as to act outwardly. It is thus that the petals of the lily are disposed, which are so many sections of the parabola. Notwithstanding the large size and the whiteness of its cup, the more it expands, the more it disperses the fervent heat of the Sun ; and while, in the middle of Summer, at noon day, all other flowers, parched by his burning rays, droop and bend their heads to the ground, the lily rears his head like a king, and contemplates, face to face, the dazzling orb, which is travelling majestically through the Heavens.

I proceed to display, in a few words, the positive, or negative, relations of flowers, with respect to the Sun, to the five elementary forms which I have laid down, in the preceding Study, as the principles of the harmony of bodies. This is not so much a plan which I take upon me to prescribe to Botanists as an invitation to engage in a career so rich in observations, and to correct my errors by communicating some portion of their knowledge.

There are, therefore, reverberating flowers *perpendicular, conical, spherical, elliptical, parabolic, or plane*. To these curves may be referred most of the curves of flowers. There are, likewise, some flowers in form of a parabol, but the others are much more numerous ; for the negative effects, in every harmony, are in much greater number than the positive effects. For example, there is but one single way of coming into life, and there are thousands of going out of it. We shall oppose, however, to every positive relation of flowers to the Sun, a principal negative relation, that we may be enabled to compare their effects in every Latitude.

PERPENDICULAR reverberating flowers are those which grow adhering by the back to a cone, to long catkins, or to an ear : Such are those of the cedar, of the larch, of the fir, of the birch, of the juniper ; of most of the northern gramineous plants, of the vegetables of cold

and lofty mountains, as the cypress and the pine ; or of those which flower in our climates about the end of Winter, as the hazel and the willow. A part of the flowers in this position is sheltered from the North wind, and receives the reflection of the Sun from the South side.

It is remarkable that all vegetables which bear cones, catkins, or spikes, present them at the extremity of their stems, exposed to all the action of the Sun. It is not so with those which grow within the Tropics ; most of which, such as the palm tree, bear divergent flowers, attached to pendent clusters, and shaded by their branches. The greatest part of the gramineous plants of warm countries, have likewise divergent ears ; such are the millets of Africa. The solid ear of the American maize is crowned with a hairy tuft which shelters its flowers from the Sun. On the annexed plate are represented an ear of European corn, and an ear of the rice of southern Asia, to furnish the means of comparison.

CONICAL reverberating flowers reflect on the parts of florification a complete cone of light. Its action is very powerful ; and it is, accordingly, very remarkable, that Nature has given this configuration of petal only to flowers, which grow under the shade of trees, as to the convolvulus, which scrambles up around their trunk ; and that she has assigned to this flower a very transient duration, for it scarcely lasts half a day ; and when its fecundation is completed, the border contracts inwardly, and gathers together like a purse. Nature has, however, given it a place in southern latitudes, but she has there tinged it with violet and blue, in order to weaken the effect. Besides, this flower scarcely ever opens in hot countries, except in the night. From this nocturnal character, I presume, it is, that we are chiefly enabled to distinguish the convolvulus of the South, from that of our own climates, which blows in the day time. In the plate we have represented the day convolvulus, or that which is native with us, expanded ; and that of the night, or of hot

countries, closed; the one having a positive character with the light, and the other a negative character.

The flowers which partake the most of this conical form are those which grow early in the Spring, as the flower of the arum, which is formed like a cornet; or those which thrive on lofty mountains, as the bears ear of the Alps. When Nature employs it in Summer, it is almost always with negative characters, as in the flowers of the foxglove, which are inclined, and died a deep red, or blue colour.

SPHERICAL reverberating flowers, are those whose petals are formed into segments of a circle. One might amuse himself very agreeably, in observing that these spherically formed petals have, at their focuses, the antheræ of the flower supported on fibrets, longer or shorter, as the effect intended may require. It deserves farther to be remarked, that each petal is adapted to its particular anthera, sometimes to two, or even to three: So that the number of petals in a flower divides, almost always, exactly that of the antheræ. As to the petals, they scarcely ever exceed the number of five, in rose formed flowers, as if Nature had designed to express, in that, the number of the five terms of elementary progression, of which this beautiful form is the harmonic expression.

Spherical reverberating flowers are very common in our temperate climates. They do not throw back the whole reflection of their disks on the antheræ, like the convolvulus, but only the fifth part, because each of their petals has its particular focus. The rose formed flower is spread over most fruit trees, as the apple, the pear, the peach, the plum, the apricot, and the like; and over a great part of our shrubbery and herbage, such as the black and white thorn, the bramble, the anemone, and many others, most of which produce for Man a nutritious fruit, and which flower in the month of May. To this form may be likewise referred such as are spheroidal; the lily of the valley, for example.

This form, which is the harmonic expression of the five elementary forms, was admirably adapted to a temperature like ours, which is itself the proportional medium between that of the Icy and of the Torrid Zone. As spherical reflectors collect a great quantity of rays at their focuses, their action is very powerful, but, at the same time, of very transient duration. It is well known that nothing fades more quickly than a rose.

Rose formed flowers are very rare between the Tropics, especially those whose petals are white. They thrive only under the shade of trees. I have known many of the inhabitants of the Isle of France make fruitless efforts to raise strawberries there; but one of them, who lived, indeed, in an elevated part of the Island, found means of procuring them in great plenty, by planting his beds under trees, in ground but half cleared.

As a compensation for this, Nature has multiplied, in warm countries, papilionaceous, or leguminous flowers. The leguminous flower is entirely opposite to the rose formed. It usually has five rounded petals, like the other: But instead of being disposed round the centre of the flower, in order to reverberate thither the rays of the Sun, they are, on the contrary, folded inward, around the antheræ, for the purpose of sheltering them. You distinguish in them, a pavilion, two wings, and a ridge, usually divided into two, by which the antheræ and the embryo of the fruit are closely covered over. Between the Tropics, accordingly, a great number of trees, shrubs, creepers and grasses, have papilionaceous flowers. Every species of our pease and French beans, succeed there wonderfully well, and those countries produce infinite varieties of them. Nay, it is remarkable, that even at home, those plants delight in a sandy and warm soil, and exhibit their flowers in the middle of Summer. I consider leguminous flowers, therefore, as of the parasol kind. To those same negative effects of the Sun may, likewise, be referred the form of flowers with gullets, which conceal their antheræ, such

as the calfs snout, which takes pleasure in blowing on the sides of walls.

ELLIPTICAL reverberating flowers are those which present oval formed cups, narrower at top than in the middle. It is very perceptible that this form of cup, the perpendicular petals of which approach toward each other at the summit, shelters, in part, the bottom of the flower : And that the curves of these same petals, which have several focuses, do not collect the rays of the Sun toward one single centre : Such is the tulip. It is remarkable, that this oblong formed flower is more common in warm countries than the rose formed. The tulip grows spontaneously in the vicinity of Constantinople. To this form may likewise be referred that of the liliaceous, which are more common there than elsewhere. However, when Nature employs them in countries still farther to the South, or in the middle of Summer, it is almost always with negative characters ; thus, she has inverted the tulip form flowers of the imperial, which is originally from Persia, and has shaded them with a tuft of foliage. Thus, she bends back outwardly, in our climates, the petals of the lily ; but the species of white lilies which grow between the tropics, have, besides, their petals cut out into thongs.

Flowers with PARABOLIC, or PLANE, mirrors, are those which reflect the rays of the Sun in parallel directions. The configuration of the first gives much lustre to the corolla of these flowers, which emit from their bottom, if I may be allowed the expression, a bundle of light, for they collect it toward the bottom of their corolla, and not on the antheræ. It is, perhaps, in order to weaken the action of it, that Nature has terminated flowers of this form in a species of cowl, which Botanists call spur. It is probably in this tube that the focus of their parabola terminates, which is, perhaps, situated there, as in many curves of this kind, beyond its summit. Flowers of this sort are frequent between the Tropics ; such is the flower of the *poincillade* of the Antilles, otherwise called the

peacock flower, on account of its beauty ; such is also the *nafturtium*, or nun of Peru. It is even pretended that the perennial species is phosphoric in the night time.

Flowers with plane mirrors produce the same effects ; and Nature has multiplied the models of them in our Summer flowers, and in those which thrive in warm and sandy soils, as the radiated ; such are the flowers of the dandelion. We likewise meet with them in the flowers of the *doronicum*, of the lettuce, of the succory ; in the asters, in the meadow daisy and others. But she has placed the original model of them under the Line, in America, in the broad Sun flower, which we have borrowed from Brasil.

These being flowers whose petals have the least activity, are likewise those which are of the longest duration. Their attitudes are varied without end. Such as are horizontal, like those of the dandelion, close, it is said, toward the middle of the day ; they are, likewise, such as are the most exposed to the action of the Sun, for they receive his rays from his rising to his setting.

There are others which, instead of closing their petals, invert them, which produces nearly the same effect ; such is the flower of the camomile. Others are perpendicular to the Horizon, as the flower of Lettuce. The blue colour, with which it is tinged, contributes, farther, towards weakening the rays of the Sun, which, in this aspect, would act too vehemently upon it. Others have only four horizontal petals ; such as the cruci form ; the species of which are very common in hot countries. Others bear, around their disk, flowrets which overshadow it ; such is the blue bottle of the corn field, which is represented on the plate in opposition to the daisy. This last flowers early in the Spring, and the other in the middle of Summer.

We have said somewhat of the general forms of flowers, but we should never come to a conclusion, were we to enter into a discussion of their various aggregations. I

believe, however, that they may be referred to the plan itself of the flowers. Thus the umbelliferous flowers present themselves to the Sun under the same aspects as the radiated.

I must beg leave to recapitulate only what has been said respecting their reflecting mirrors. The reverberated perpendicular, of a cone or ear form, collects on the antheræ of the flowers, an arch of light of ninety degrees, from the Zenith to the Horizon. It farther presents, in the inequality of its panels, reflecting surfaces.

The conical reflector collects a cone of light of sixty degrees. The spherical reflector unites, in each of its five petals, an arch of light of thirty-six degrees of the Sun's course, supposing that Luminary to be in the Equator.

The elliptical reflector collects a smaller quantity, from the perpendicular position of its petals; and the parabolic reflector, as well as that with plane mirrors, sends back the rays of the Sun divergently, or in parallels.

The first form appears to be very common in the flowers of the icy Zones; the second, in those which thrive under the shade; the third, in temperate latitudes; the fourth, in warm countries; and the fifth, in the Torrid Zone. It would likewise appear, that Nature multiplies the divisions of their petals, in order to diminish their action. Cones and ears have no petals. The convolvulus has but one; rose formed flowers have five; elliptical flowers, as the tulip and the liliaceous, have six; flowers with plane reflectors, as the radiated, have a great number.

Farther, flowers have parts adapted to the other elements. Some are clothed externally with a hairy garment, to shelter them from the cold. Others are formed to blow on the surface of the water; such are the yellow roses of the nymphæa, which float on lakes, and accommodate themselves to the various movements of the waves, without being wet by them, by means of the long and pliant stems to which they are attached. Those of the *valis-*

neria are still more artfully disposed. They grow in the Rhone, and would be there exposed to frequent inundation by the sudden swellings of that river, had not Nature given them stems formed like a corkscrew, which draw out at once to the length of three or four feet.

There are other flowers adapted to the winds and to the rains, as those of pease, which are furnished with little boats to cover and shelter the stamina, and the embryos of their fruits.* Besides, they have large pavilions, and rest on tails bent and elastic, as a nerve; so that when the wind blows over a field of pease, you may see all the flowers turn their back to the wind, like so many weather cocks.

This class appears to be very generally diffused over places much exposed to the winds. *Dampier* relates, that he found the desert shores of New Guinea covered with pease, whose blossoms were red and blue. In our climates, the fern, which crowns the summits of hills always battered with the wind and rain, bears its flower turned toward the Earth, on the back of its leaves. There are even certain species of plants, the flowering of which is regulated by the irregularity of the winds. Such are those, the male and female individuals of which grow on separate stems. Tossed hither and thither over the earth, frequently at great distances from each other, the powder of the male flowers could fecundate but a very few female flowers, unless, at the season of their florification, the wind blew

* I am persuaded, that the bearing of most flowers is adapted to the rains, and for this reason it is that many of them have the form of mufflers, or ridges, like little boats inverted, which shelter the parts of fecundation. I have remarked that many species of flowers possess the instinct, shall I venture to call it? of closing themselves when the air is humid, and that the impregnation of fruit tree blossoms is injured much more by the rain than by the frost. This observation is of essential importance to gardeners, who frequently cause the flowers of their strawberry plants to miscarry by watering them. As far as I can judge, it would be better to water plants, in blossom, by little trenches, according to the Indian method, rather than by asperision.

from various quarters. Wonderful to be told! there are invariable generations depending on the variableness of the wind. Hence I presume, that, in countries where the winds always blow from the same quarter, as between the Tropics, this species of florification must be uncommon; and if it be found there at all, it must be regulated precisely according to the season when those regular winds vary.

It is impossible to entertain a doubt respecting those admirable relations, however remote they may appear, when we observe the attention with which Nature has preserved flowers from the frosts to which they might be exposed, from the winds themselves, upon their stems. She inwraps them, for the most part, in an integument, which Botanists call the *calix*. The more ramous the plant is, the thicker is the calix of its flower. She sometimes fringes it with little cushions and beards, as may be seen in the rose bud. Thus the mother puts a pad round the head of her little child, to secure it against accidents from falling. Nature has so clearly marked her intention as to this, in the case of the flowers of ramous plants, that she has deprived of this clothing such as grow on stems that are not branchy, and where they are in no danger from the agitation of the winds. This may be remarked with regard to the flowers of Solomon's seal, of the lily of the valley, of the hyacinth, of the narcissus, of most of the liliaceous, and of plants which bear their flowers isolated, on perpendicular stems.

Flowers have, farther, very curious relations with animals and with Man, from the diversity of their configurations, and from their smells. Those of one species of the orchis represent bugs, and exhales the same unpleasant odour. Those of a species of the arum resembles putrid flesh, and has the infection of it to such a degree, that the flesh fly resorts thither to deposit her eggs. But those relations, hitherto very superficially investigated, do not come in so properly under this article; it is sufficient for

me to have here demonstrated, that they actually have very clearly marked relations with the elements, and especially with the Sun.

When Botanists shall have diffused over this branch of the subject all the light of which it is susceptible, by examining their focuses, the elevation to which they rise above the ground, the shelter, or the reflection of the bodies which are in their vicinity, the variety of their colours, in a word, all the means by which Nature compensates the differences of their several exposures, and they will no longer doubt about those elementary harmonies ; they will acknowledge that the flower, far from presenting an unvarying character in plants, exhibits, on the contrary, a perpetual character of diversity. It is by this, principally, that Nature varies the species in the same genus of plant, in order to render it susceptible of fecundation, on different sites. This explains the reason why the flowers of the great chestnut of India, but originally from America, are not the same with those of the European chestnut ; and that those of the fullers thistle, which thrives on the brink of rivers, are different from those of thistles, which grow in lofty and dry places.

A very extraordinary observation shall serve irrefragably to confirm all that we have just now advanced : It is this, that a plant sometimes totally changes the form of its flowers in the generation which reproduces it. This phenomenon greatly astonished the celebrated *Linnaeus*, the first time that it was submitted to his consideration. One of his pupils brought him, one day, a plant perfectly similar to the linarium, the flower excepted ; the colour, the flavour, the leaves, the stem, the root, the calix, the pericarpium, the seed, in a word, the smell, which is a remarkable circumstance, were exactly the same, only its flowers were in form of a tunnel, whereas those of the linarium are gullet formed. *Linnaeus* imagined, at first, that his pupil intended to put his knowledge to the test, by adapting a strange flower to the stem of that plant ; but he

satisfied himself that it was a real *linarium*, the flower of which Nature had totally changed. It had been found among other *linaria*, in an island, seven miles distant from Upsal, near the shore of the sea, on a sandy and gravelly bottom. He himself put it to the proof, that it reperpetuated itself in this new state by its seeds. He afterwards found some of it in other places : And, what is still more extraordinary, there were, among these last, some which carried on the same stalk flowers tunnel formed, and flowers gullet formed.

He gave to this new vegetable the name of *pelorum*, from the Greek word *πῆλωρ*, which signifies prodigy. He afterwards observed the same variations in other species of plants, and among the rest, in the *criocephalous* thistle, the seeds of which produce, every year, in the garden of Upsal, the fantastic thistle of the Pyrennées.* This illustrious Botanist accounts for these transformations, as being the effect of a mongrel generation, disturbed by the fecundating farina of some other flower in the vicinity. It may be so ; to his opinion, however, may be opposed, the flowers of the *pelorum*, and of the *linarium*, which he found united on the same individual. Had it been the fecundation which transformed this plant, it ought to have given similar flowers in the whole individual. Besides, he himself has observed, that there was not the slightest confusion in the other parts of the *pelorum*, any more than in its virtues ; but this must have been the case, as well as in the flower, had it been produced by a mixture of some strange breed. Finally, the *pelorum* reproduced itself by seed, which does not take place in any one mongrel species of animals.

This sterility, in mongrel branches, is an effect of the sage consistency of Nature, who cuts off divergent generations, in order to prevent the primordial species from being confounded, and from, at length, disappearing altogether.

* Upsalian Dissertation, for December, 1744 ; page 59, note 6.

er. As to the rest, I pry neither into the causes, nor the means, which she is pleased to conceal from me, because they far transcend my comprehension. I confine my enquiries to the ends which she kindly unfolds ; I confirm myself in the belief, from the variety of flowers in the same species, and sometimes in the same individual, that they serve, in certain cases, as reflectors to vegetables, for the purpose of collecting, conformably to their position, the rays of the Sun on the parts of fecundation ; and, in other cases, as parasols, to put them under covert from excessive heat.

Nature deals by them, nearly, as she does by animals which are exposed to the same variations of Latitude. In Africa, she strips the sheep of the woolly fleece, and gives her sleek smooth hair, like that of the horse : And to the North, on the contrary, she clothes the horse with the shaggy fur of the sheep. I have been an eye witness of this double metamorphosis, at the Cape of Good Hope and in Russia. I have seen at Petersburg, Norman and Neapolitan horses, whose hair, naturally short, was so long and so frizzled, in the middle of Winter, that you would have believed them covered with wool like sheep. It is not without reason, therefore, that the ancient proverb says : *GOD tempers the wind to the shorn lamb* : And when I behold his paternal hand varying the fur of animals conformably to the degree of heat and cold, I can easily believe, that it varies, in like manner, the mirrors of flowers conformably to the Sun. Flowers, then, may be divided, with relation to the Sun, into two classes : Into reverberating flowers, and flowers in form of a parasol.

If there be any constant character in plants, we must look for it in the fruit. It is thitherward that Nature has directed all the parts of vegetation, as to the principal object. That saying of WISDOM itself, *by their fruits ye shall know them*, is, at least, as applicable to plants as to the human species.

We shall examine, therefore, the general characters of plants, with relation to the places where their seeds are accustomed to grow. As the animal kingdom is divided into three great classes, quadrupeds, volatiles and aquatics, relatively to the three elements of the Globe ; we shall, in like manner, divide the vegetable kingdom into aërial or mountain plants ; into aquatics, or those of the shores ; and into terrestrial, or those of the plains. But as this last participates of the two others, we shall not dwell upon it ; for, though I am persuaded that every species, nay, that every variety, may be referred to some particular site of the earth, and may grow there in its highest degree of beauty, it is sufficient to say as much of it here as may be necessary to the prosperity of a small garden. When we shall have traced invariable characters, in the two extremities of the vegetable kingdom, it will be easy to refer to the intermediate classes, those which are adapted to them. We shall begin with the plants of the mountains.

Elementary Harmonies of Plants with the Water and the Air, by Means of their Leaves and their Fruits.

When the AUTHOR of Nature designed to clothe with vegetables even the highest and steepest pinnacles of the Earth, He first adapted the chains of mountains to the basins of the seas which were to supply them with vapours ; to the course of the winds which were to waft them thither, and to the different aspects of the Sun by which they were to be heated. As soon as these harmonies were established between the elements, the clouds ascended out of the Ocean, and dispersed themselves over the most remote parts of the Continents. There they distilled, under a thousand different forms, in fogs, in mists, in dews, in rains, in snows. They descended from the heights of the

Atmosphere in every possible variety of manner ; some in a tranquil air, such as our Spring showers, came down in perpendicular drops, as if they had been strained through a sieve ; others, driven by the furious winds, beat horizontally on the sides of the mountains ; others fell in torrents, like those which, for nine months of the year, inundate the Island of Gorgona, placed in the heart of the Torrid Zone, in the burning Gulf of Panama. There were some which accumulated themselves, in mountains of snow, on the inaccessible summits of the Andes, to cool, by their effusions, the Continent of South America, and, by their icy Atmosphere, the vast expanse of the Pacific Ocean. In a word, mighty rivers flowed over regions where the rain never descends, and the Nile watered the plains of Egypt.

Then GOD said : “ Let the Earth bring forth grass, “ the herb yielding feed, and the fruit tree yielding fruit “ after his kind, whose seed is in itself upon the Earth.” At the voice of the Almighty, the vegetables appeared with organs perfectly fitted to collect the blessings of Heaven. The elm arose on the mountains which skirt the Tanaïs, clothed with leaves in form of a tongue ; the tufted box started from the brow of the Alps ; and the prickly cæper tree from the rocks of Africa, with leaves hollowed into spoons. The pines on the sandy Norwegian hills attracted the vapours which were floating in the air, with their slim foliage, disposed like a Painter’s pencil ; the verbascum displayed its broad leaves on the parched sand, and the fern presented, on the hill, its fanlike foliage to the rainy and horizontal winds. A multitude of other plants, from the bosom of the rocks, from strata of flint, nay, even from marble incrustations, drunk in the waters of Heaven by cornets, by sandals and by cruets. From the cedar of Lebanon down to the violet which perfumes the grove, there was not one but what presented its large goblet, or its tiny cup, conformably to its necessity, or its station;

This adaptation of the leaves of plants, in elevated situations, for receiving the descending distillations of the rain, is varied without end ; but the character of it is discernible in most, not only in their concave forms, but likewise in a little canal, scooped out on the pedicle by which they are attached to their branches. It has something of a resemblance to that which Nature has traced on the upper lip of Man, to receive the humours which descend from the brain. It is particularly perceptible on the leaves of artichokes, which, being of the nature of thistles, agree with dry and sandy situations. These have, besides, collateral awnings to prevent the loss of any of the water that falls from Heaven. Plants which grow in places very hot, and very parched, sometimes have their stems or their leaves transformed entirely into a canal. Such are the aloes of the island of Zocotara, in the mouth of the Red Sea, or the prickly taper of the Torrid Zone. The aqueduct of the aloes is horizontal, and that of the taper perpendicular.

What has prevented Botanists from remarking the relations which the leaves of plants have with the waters that feed and refresh them, is their seeing them every where nearly of the same form, in the valleys, as on the heights ; but though mountain plants present foliages of every kind of configuration, you may easily discern, from their aggregation in form of pencils, or fans, from the gatherings of the leaves, or other equivalent signs, that they are destined to receive the rain water, but chiefly from the aqueduct which I have just mentioned. This aqueduct is traced on the pedicle of the smallest leaves of mountain plants ; by means of it, Nature has rendered the forms themselves of aquatic plants susceptible of vegetation in the most parched situations.

The bulrush, for example, which is only a round and full straw, that grows by the water side, did not appear susceptible of collecting any humidity in the air, though it is very well suited to lofty situations, from its capilla-

ceous form, which, like that of gramineous plants presents nothing to the wind to lay hold of. In fact, if you consider the different species of rush which clothe the mountains in many parts of the world, such as that called *icho*, on the lofty mountains of Peru, the only vegetable almost that grows there, and those which thrive with ourselves in dry sands, or on heights, you would, at the first glance, believe them similar to the rush of marshy places ; but with a little attention, and not without astonishment, you will observe that they are hollowed into a furrow the whole of their lengthwise direction. They are, like other rushes, convex on one side, but they differ from them essentially, in that they are all concave on the other ; I was enabled to distinguish, by this same character, the *spartha*, which is a rush of the mountains of Spain, and is now frequently manufactured at Paris into cordage for their draw wells.

Many leaves, even of the plants of the plains, assume, on their first springing up, this form of little furrow, or spoon, as those of the violet, and of most gramineous plants. You may perceive, in the Spring, the young tufts of these raising themselves upright toward Heaven, like paws, to catch the falling drops, especially when it begins to rain ; but most plants of the plains lose their gutter as they expand. It has been bestowed on them only during the season when it was necessary to their growth. It is permanent only in the plants of the mountains. It is traced, as has been mentioned, on the pedicle of the leaves, and conducts the rain water into the tree, from the leaf to the branch : The branch, by the obliquity of its position, conveys it to the trunk, from whence it descends to the root, by a series of successive dispositions. If you pour water gently over the leaves of a mountain shrub, which are the farthest from its stem, you will perceive it pursue the progress which I have just indicated, and not a single drop will be lost on the ground.

I have had the curiosity to measure, in some mountain plants, the inclination which their branches form with their stem; and I have found, in at least a dozen of different species, as in the fern, the thuia, and the like, an angle of about thirty degrees. It is very remarkable, that this degree of incidence is the same with that which is formed, in a flat country, by the course of many rivulets and smaller rivers, with the great rivers into which they discharge themselves, as may be ascertained by reference to maps. This degree of incidence appears to be the most favourable to the efflux of many fluids, which direct themselves toward one single line. The same Wisdom has regulated the level of the branches in trees, and the course of the stream through the plains.

This inclination undergoes some varieties in certain mountain trees. The cedar of Lebanon, for example, sends forth the lower parts of its branches, in an upward direction, toward Heaven, and lowers their extremities, by bending them downward to the Earth. They have the attitude of command which is suited to the king of vegetables, that of an arm raised up into the air, with the hand gently inclining. By means of the first disposition, the rain water is conveyed along the sloping branch to the trunk; and by the second, the snows, in the regions of which it takes delight to dwell, slide away from off its foliage. Its cones have, in like manner, two different attitudes; for it inclines them, at first, toward the Earth, to shelter them at the season of their flowering; but when they are fecundated, it erects them toward Heaven. The truth of these observations may be confirmed by referring to a young and beautiful cedar in the Royal Garden, which, though a stranger, has preserved, in the midst of our climate, the air of a King, and the majestic port of Lebanon.

The bark of most mountain trees is equally adapted for conducting the rain water from the branches to the roots. That of the pine is in large perpendicular ribs; that of

the elm is cleft and chinked longitudinally ; that of the cypress is spongy, like the coat of flax.

The plants of mountains, and of dry grounds, have a farther character, which is, in general, peculiar to them : It is that of attracting the water which floats in the air, in imperceptible vapours. The parietaria (pellitory) which has derived its name from the Latin word *pariete*, (wall) because it grows on the sides of walls, has its leaves almost always in a humid state. This attraction is common to most trees of the mountains. Travellers unanimously assure us, that there is, in the mountains of the Island of Ferro, a tree, which furnishes every day, to that island, a prodigious quantity of water. The islanders call it *garoé*, and the Spaniards *santo*, from its singular utility. They tell us it is always surrounded with a cloud, which distils copiously along its leaves, and fills with water the large reservoirs which are constructed at the root of this tree, affording an abundant supply for the island.

This effect is, perhaps, somewhat exaggerated, though related, in nearly the same terms, by persons of different Nations : But I give full credit to the general fact. The real case I take to be this, it is the mountain which attracts from afar the vapours of the Atmosphere, and that the tree, situated in the focus of attraction, collects them around it.

Having frequently spoken, in the course of this Work, of the attraction of the summits of many mountains, the Reader, perhaps, will not be displeased, if I present to him, in this place, an idea of that branch of the hydraulic architecture of Nature. Among a great number of curious examples, which I might produce to this purpose, and which I have collected, as an addition to my materials on the subject of Geography, I beg leave to present one, which I have extracted, not from a systematic Philosopher, but from a simple and unaffectedly sprightly traveller of the last age, who relates things as he saw them, and without pretending to deduce consequences of any kind what-

ever. It is a description of the summits of the Island of Bourbon, situated in the Indian Ocean, extending to the twentyfirst degree of South Latitude. It is copied from the writings of M. *de Villers*, who was then Governor of that island, under the Eastindia Company. It is published in the journals of the first voyages made by our French Navigators into *Arabia Felix*, about the year 1709, and given to the World by M. *de la Roque*. See that Work, page 201.

“ Of those plains,” says M. *de Villers*, which are upon the mountains (of Bourbon) “ the most remarkable, “ though no account has hitherto been given of it, is that “ to which they have given the name of the Plain of the “ Cafres, from a tribe of that People, slaves to the inhabitants of the Island, who went thither to conceal themselves, after they had ran away from their masters. “ From the shore of the sea, you rise by a gentle ascent, “ for seven leagues together, in order to reach this plain, “ by the single path that leads to it, along the river of “ Saint Stephen : It is possible, however, to ride up on “ horseback. The soil is good and smooth to about a “ league and a half, on this side the plain, planted with “ large and beautiful trees, the foliage of which, as it falls, “ serves for food to the tortoises, which are to be found “ there in great numbers.

“ The height of this plain may be estimated at two “ leagues above the Horizon ; it accordingly appears “ from below to be quite lost in the clouds. Its circumference may be about four or five leagues. The cold “ is there insupportable, and *a continual fog, which wets “ as much as rain*, prevents your seeing objects ten paces “ distant ; as it falls in the night, you may see through it “ more clearly than by day : But then it freezes dreadfully, and in the morning, before sun rise, the plain is “ frozen all over.

“ But what strikes the eye of the beholder as very extraordinary, are certain elevations of ground, cut out

“ almost in form of round columns, and of a prodigious
 “ height ; for they cannot be much lower than the tur-
 “ rets of Notre Dame at Paris. They are put down like
 “ pins on the skittle ground, and the resemblance is so
 “ strong, that you may easily mistake on reckoning them :
 “ They go by the name of *pitons* (pins). If you wish to
 “ stop by one of those eminences to take rest, such of
 “ your company as are not inclined to repose, but want
 “ to go forward, must not withdraw so much as two hun-
 “ dred paces, otherwise they will be in great danger of
 “ not finding again the point of separation, these pins are
 “ so many in number, all similar in form, and so much
 “ arranged in the same manner, that the Creoles, who are
 “ native there, are themselves liable to mistake.

“ For this reason it is, that, in order to prevent the un-
 “ pleasant consequences of such an error, when a compa-
 “ ny of travellers take station at one of the pins, if any
 “ are disposed to make a farther excursion, they leave a
 “ person at the place of rendezvous, to make a fire, or
 “ raise a smoke, which may serve to direct, and bring
 “ back the strayers ; and if the *fog* be *so thick*, which is
 “ frequently the case, as to hinder the fire or the smoke
 “ from being seen, they provide themselves with a kind
 “ of large shells, one of which is left with him who keeps
 “ station at the pin ; another is carried off by the separat-
 “ ing party ; and when they wish to return, some one
 “ blows violently into the shell, as into a trumpet, which
 “ emits a very shrill sound, and capable of being heard at
 “ a great distance ; this is answered by the other, and be-
 “ ing repeated as often as is necessary, they are easily re-
 “ covered from straying, and collected at the point of de-
 “ parture. Without such precautions, the traveller might
 “ be bewildered.

“ In this plain are many aspin trees, and they are al-
 “ ways green. Other trees are covered with a moss of
 “ more than a fathom in length around their trunk and
 “ large branches. They are withered, without foliage,

“ and so impregnated with moisture, that it is impossible
“ to make them take fire. If, with much difficulty, you
“ are able to kindle some of the smaller boughs, it is only
“ a dark fire without flame, which emits a reddish
“ smoke, that defiles the meat instead of roasting it. You
“ can hardly find a spot in this plain on which to kindle
“ a fire, unless by looking about for some small elevation
“ round the peaks ; for the soil of the plain is so humid,
“ that the water every where spouts out, so that you are
“ continually in mud, and moistened up to the calf of the
“ leg. Great numbers of blue birds are to be seen there
“ nestling in the herbage, and among the aquatic ferns.
“ This plain was unknown before the desertion of the
“ Cafres. In order to get down, you must return by the
“ same way that you ascended, unless you choose to run
“ the risk of another path, which is very rough, and dangerously steep.

“ From the plain of the Cafres may be seen the mountain known by the name of *Trois Salases*, from the three points of that rock, the loftiest in the Island of Bourbon. All its rivers issue from thence, and it is so steep on every side, that there is no possibility of climbing it.

“ There is, besides, in this island, another plain, called the Plain of Silaos, higher than that of the Cafres, and of no greater value : It is extremely difficult to get up to it.”

In the lively description of our Traveller, we must overlook some errors in Physics, such as his assigning to the Plain of the Cafres an elevation of two leagues above the Horizon. He had not learned from the barometer and thermometer, that there is no such elevation on the face of the Globe, and that, at the perpendicular height of one league only, the freezing point is invariable. But from the thick fog which surrounds those peaks, from that continual mist which wets as much as rain, and which falls during the night, it is evidently perceptible, that they at-

tract to them the vapours, which the Sun raises out of the Sea in the day time, and which disappear in the night. Hence is formed that sheet of water which inundates the Plain of the Cafres, and from which most of the brooks and rivulets that water the island take their rise. You may equally distinguish a vegetable attraction in those evergreen aspens, and those other trees, at all times humid, which it is impossible to kindle into flame.

The Island of Bourbon is almost round, and rises out of the Sea in the shape of half an Orange. On the highest part of this hemisphere are situated the Plains of Silaos and of the Cafres, where Nature has placed those labyrinths of peaks continually involved in fogs, planted like nine pins, and elevated like so many turrets.

Did time and room permit, I could make it evident, that there are a multitude of similar peaks on the chains of lofty mountains, of the Cordeliers, of Taurus and others, and at the centre of most islands, without admitting the possibility of supposing, though the opinion be current, that they are the remains of a primitive Earth raised to that height ; for, What must have become, as has been already demanded, of the wreck of that Earth, the pretended testimonies of which arise on every hand over the surface of the Globe ? I could demonstrate that they are placed in aggregations, and in situations adapted to the necessities of the countries of which they are, in some sense, the reservoirs ; some in a labyrinth, as those of the Island of Bourbon, when they are on the summit of a hemisphere, from whence they are destined to distribute the waters of Heaven in every direction ; others in form of a comb, when they are placed on the extended crest of a chain of mountains, as the pointed peaks of the chain of Taurus and of the Cordeliers ; others grouped into pairs, into threes, according to the configuration of the territory which they are to water. They are of many forms, and of different constructions : Some of them are incrustations of earth, as those of the Plain of the Cafres, and of some of the An-

tilles Islands, and which are besides so steep, as to be entirely inaccessible. Those incrustations of earth demonstrate, that they have, at once, fossil and hydraulic attractions.

There are others which present long needles of solid and naked rock ; others are of a conical form ; others are flattened as a table, such as that of Table mountain, at the Cape of Good Hope, where you may frequently see the clouds accumulate, and spread like a table cloth. Some are not apparent, but entirely involved in the side of mountains, or in the bosom of plains. They are all distinguishable by the fogs which they attract around them, and by the sources which emit their streams in the vicinity. Nay, you may rest assured, that there is no source but in the neighbourhood of some quarry of hydro attractive, and, for the most part, of metallic stone. I ascribe the attraction of those peaks to the vitreous and metallic bodies of which they are composed : And I am persuaded it might be possible to imitate this architecture of Nature, and to form, by means of the attraction of such stones, fountains of water in the most parched situations. In general, vitreous bodies, and stones susceptible of polish, are very proper for this purpose ; for it is observable, that when water is diffused in great quantities through the air, as at the time of a general thaw, it is first attracted, and attaches itself, to the glass windows and the polished stones of our houses.

I have frequently seen on the summit of the mountains, in the Isle of France, effects similar to those of the peaks of the Plain of the Cafres, in the Island of Bourbon. The clouds collect there incessantly around their peaks, which are steep and pointed, like pyramids. Some of those peaks terminate in a rock of a cubical form, which crowns them like a chapter. Such is that one which they call *Piterbooth*, after the name of a Dutch Admiral ; it is one of the loftiest in the Island.

Those peaks are formed of solid rock, vitrifiable, and mixed with copper : They are real electrical needles, both in form and substance. The clouds perceptibly deviate from their course to collect upon them, and there accumulate, sometimes to such a degree, that the pinnacles become totally invisible. They thence descend into the cavity of the valleys, along the declivities of the forests, which likewise attract them, and there dissolve into rain, frequently forming rainbows on the verdure of the trees. This vegetable attraction, of the forests of that island, is in such perfect harmony with the metallic attraction of the peaks of its mountains, that a field situated in an open place, in their vicinity, very often suffers for want of rain, whereas it rains almost the whole year round in the woods, which are not above a gunshot distant. It was by the destruction of part of the trees that clothed the heights of the island, that most of the brooks which watered it have been dried up : And now nothing remains of them but the empty channel.

To the same injudicious management, I ascribe the sensible diminution of a considerable part of the rivers of Europe, both great and small ; as is evident from a simple inspection of their ancient bed, which is much broader and deeper than the mass of water at this day transmitted by them to the Ocean. Nay, I am persuaded, that to this cause we must ascribe the dryness of the more elevated provinces of Asia, those of Persia, in particular, the mountains of which have, no doubt, been injudiciously stripped of their trees, by the first tribes who inhabited them. I am decidedly of opinion, that were we to plant in France mountain loving trees, on the high grounds, and at the sources of our rivers, their ancient volume of water might be restored, and many rivulets might be made to reassume their current through our plains, though they have long since ceased to flow. It is neither among the reeds, nor in the depth of the valley, that the Naiads conceal their exhaustless urns, as Painters represent them, but at the

LEAVES WITH AN AQUEOUS AND VOLATILE FRUITS OF MOUNTAIN VEGETABLES

Leaves & Seeds of the Mountain Maple



Spartina
or rush of the Spanish
Mountains

Rush of the
Marshes

Leaf & Cone
of the Cedar
of Lebanon



Stump of the
Spartina with
its Gutter

Leaf & Seeds
of the
Dandelion



Kernel of the Cedar
attached to its Wing

Full Stump
of the Rush of
the Marshes



summit of rocks crowned with wood, and towering to the Heavens.

There is not a single vegetable, the leaf of which is disposed to receive the rain water on the mountains, whose seed is not formed in a manner the best adapted to raise itself thither. The seeds of all mountain plants are volatile. By inspecting their leaves, it is possible to ascertain the character of their grains, and by inspecting the grains, that of their leaves, and thence to infer the elementary character of the plant. By mountain plants, I here wish to be understood to mean all those which grow in sandy and parched situations, on hillocks, in rocks, on steep ridges by the highway's side, in walls, and, in one word, at a distance from water.

The seeds of thistles, of blue bottles, of dandelion, of fuccory, and many others, are furnished with pinions, with plumes, with tufts, and various other means of rising, which convey them to prodigious distances. Those of the grasses, which likewise travel very far, are provided with a light chaffy coat, and with bearded husks. Others, such as those of the yellow gilliflower, are cut into thin scales, and fly by the slightest breath of the wind, and plant themselves in the most inconsiderable crevice of a wall. The seeds of the largest mountain trees are no less volatile. That of the maple has two membranous pinions, similar to the wings of a fly. That of the elm is cased in the midst of an oval thin leaf. Those of the cypress are almost imperceptible. Those of the cedar are terminated by broad and thin plates, which, in their aggregated state, compose a cone. The grains are in the centre of the cone; and when arrived at maturity, the thin membranes, to which they adhere, separate from each other, like the cards in a pack, and each of them flies off with its own little kernel. (*See the annexed Plate.*)

The seeds of mountain plants, which appear too heavy for flying, are furnished with other resources. The pease of the balsamine have pods whose elasticity darts them to a

considerable distance. There is likewise a tree in India, the name of which I do not now recollect, that, in like manner, discharges its seeds with a noise like that of a musket fired off. Those which have neither tufts, nor pinions, nor springs, and which, from their weight, seem condemned to remain at the foot of the vegetable which produced them, are, in very many cases, those which travel the farthest. They fly off with the wings of a bird. It is thus that a multitude of berries and shell fruits resow themselves. Their seeds are inclosed in stony incrustations, not capable of being digested. They are swallowed by the birds, which carry them off, and plant them in the cornices of towers, in the clefts of rocks, on the trunks of trees, beyond rivers, nay, beyond oceans. By such means it was that a bird of the Moluccas repeopled, with the nutmeg plant, the desert islands of that archipelago, in defiance of all the efforts of the Dutch, who destroy those trees in every place where they cannot be subservient to their own commerce.

This is not the place for bringing forward the relations which vegetables have to animals. It is sufficient to observe, as we go along, that most birds resow the vegetable which feeds them. Nay, we find, without going from home, quadrupeds which convey to a great distance the seeds of the grasses. Such, among others, as do not chew the cud, horses for instance, whose dung is hurtful to the meadows, for an obvious reason, they introduce into them a variety of foreign herbs, as the heath and the short furze, the seeds of which they are unable to digest. They resow, besides, a great many others, which adhere to their hair, by the motion of their tail simply. There are quadrupeds of small size, such as the dormouse, the hedgehog and the marmot, which convey to the most elevated regions of the mountains, acorns, beechmast and chesnuts.

It is singularly worthy of remark, that volatile seeds are produced in much greater number than those of other species; and in this, we are called upon to admire the intel-

ligence of that Providence which foresaw every thing, and arranged all accordingly. The elevated situations for which they are destined, were exposed to be speedily stripped of their vegetables, by the declivity of their soil, and by the rains, which have a continual tendency to lower them. By means of the volatility of grains, they are become, of all the places of the Earth, the most prolific in plants. In the mountains is deposited the Botanist's treasure.

It cannot be too frequently repeated, The remedies provided by Nature always surmount the obstacles which she has opposed ; and her compensations ever exceed her gifts. In truth, if you except the inconveniencies of declivity, a mountain presents to plants the greatest variety of exposures. In a plain they have the same Sun, the same degree of humidity, the same soil, the same wind ; but if you ascend a mountain, situated in our Latitude, only twentyfive fathoms of perpendicular height, you change your climate as much as if you had travelled twentyfive leagues northward ; so that a mountain of twelve hundred fathoms perpendicular height, would present us with a scale of vegetation as extensive as that of twelve hundred leagues along the Horizon, which is nearly our distance from the Pole : Both the one and the other would terminate in a region of perpetual ice. Every step we take upon a mountain, whether ascending or descending, gives us a change of Latitude ; and if we encompass it round and round, every step changes our Longitude. We shall fall in with points where the Sun rises at eight o'clock in the morning ; others, at ten o'clock ; others, at noon. We should find an infinite variety of exposures ; of cold toward the North, of heat to the South, of rain to the West, of drought to the East ; without taking into the account the different reflections of heat in sands, rocks, bottoms of valleys and lakes, which modify them a thousand various ways.

We must proceed farther to observe; and who can do it without profound admiration? that the season of the maturity of most volatile seeds takes place toward the commencement of Autumn; and that, from an effect of the universal Intelligence, which constrains all the parts of Nature to act in concert, then it is that we have the most violent gales of wind, about the end of September or beginning of October, called the equinoctial winds. These winds blow in all parts of the Continents, from the bosom of the seas to the mountains which are in correspondence with them. Not only do they convey thither the volatile grains which have then attained to a state of maturity; but likewise blend with these thick clouds of dust, which they carry off from lands dried up by the burning heats of Summer, and particularly from the shores of the Sea, where the incessant motion of the billows, which there break, and continually toss the pebbly strand backward and forward, reduce the hardest bodies to an impalpable powder.

Those emanations of dust are in many places so copious, that I could produce a variety of instances of vessels covered with them, as they were crossing gulfs, though more than six leagues distant from land. They are so troublesome in the loftier provinces of Asia, that all travellers who have visited Pekin assure us, it is impossible to walk the streets of that city, for a considerable part of the year, without having the face veiled. Thus there are rains of dust which repair the summits of the mountains, as there are rains of water which feed their sources. Both the one and the other issue from the Sea, and return to it by the course of the rivers, which are perpetually conveying thither, their constant tribute of waters and sands. The maritime winds unite their efforts toward the autumnal equinox, transport from the circumference of the Continents, to mountains the most remote from them, the seeds and the manure which had flowed from thence, and sow meadows, groves and forests, on the sides of precipi-

ces, and the most inaccessible peaks. Thus the leaves, the stems, the seeds, the birds, the seasons, the seas and the winds, concur, in a most wonderful manner, to keep up the vegetation of the mountains.

I have been mentioning the relations of plants to mountains; I am mortified that it is not in my power here to insert the relations which mountains themselves have with plants, according to my original intention. All that I can, at present, say on the subject is, that so far are mountains from being the productions of a centrifugal force, or of fire, or of earthquakes, or of water courses, I know of, at least, ten different species, each of which has a configuration the most perfectly adapted for keeping up, in every particular Latitude, the harmony of the elements relatively to vegetation. Each of them has, moreover, vegetables and quadrupeds peculiar to itself, and which are not elsewhere to be found: This proves to a demonstration, that they are not the work of chance. Finally, among that inconceivable number of mountains which cover the greatest part of the five Zones, and especially the Torrid and the Icy Zones, there is but one single species, the least considerable of all, which presents to the water courses projecting and retreating angles in correspondence. This, however, is no more their work than the basin of the seas is itself the work of the Ocean. But this interesting subject, of an extent too considerable to admit of its being here introduced, belongs, besides, to the province of Geography.

Let us now proceed to display the harmonies of aquatic plants.

These have dispositions entirely different in their leaves, the bearing of their branches, and, above all, in the configuration of their seeds. Nature, as has already been observed, in order to vary her harmonies, only employs, in very many cases, positive and negative characters. She has bestowed an aqueduct on the pedicle of the leaves of mountain plants; she withdraws it from those which grow

by the side of the waters, and transforms them into aquatic plants. These, instead of having their leaves hollowed out into gutters, are clothed with leaves smooth and sleek, such as the cornflag, which bears them in form of a poignard's blade, or swelling in the middle like a sword blade, as those of the species of reed called typha, that common sort, the stem of which the Jews put into the hand of JESUS CHRIST. Those of the nymphæa are plane, and rounded in form of a heart. Some of these species affect other forms, but their long tails are uniformly destitute of a canal. Those of the bulrush are round like a pipe. There is an endless variety of rushes on the brink of morasses, rivulets and fountains. You will find them of all sizes, from those which have the fineness of a hair, up to the species which grows in the river of Genoa, as large as a cane. Whatever difference there may be in the jointing of their stalks and of their pannicles, they all have, in their plan, a round or elliptical form. You will find those species alone which grow in parched situations, to be fluted and hollowed on their surface. When Nature intends to render aquatic plants susceptible of vegetation on the mountains, she bestows aqueducts on their leaves; but when, on the contrary, she means to place mountain plants by the water's side, she withdraws it. The aloës of the rock has its leaves hollowed into a scoop; the aloës of the water has them full. I am acquainted with a dozen species of mountain fern, every one of which has a small fluting along its branches, and the only species of the marshes, which I know, wants it. The bearing of its branches is likewise very different from that of the others. The first rears them toward Heaven, the last bears them almost horizontally.

If the leaves of mountain plants are constructed in the best manner possible for collecting, at their roots, the waters of Heaven, which they have not always at command; those of aquatic plants are frequently disposed in such a manner, as to remove them, because they are destined to

grow in the bosom of water, or in its vicinity. The leaves of trees which love the water's side, as the birch, the aspen and the poplar, are attached to long and pendent tails. There are others which bear their leaves disposed in form of tiles, as the great chefnut of India and the walnut. Those of plants which grow in the shade, around the trunk of trees, and which derive, by their roots, the humidity collected by the foliage of the tree, as the French bean and the convolvulus, have a similar bearing. But those which grow entirely under the shade of trees, and which have scarcely any roots, as mushrooms, have leaves, that, so far from pointing toward Heaven, are turned downward to the earth. The greatest part are formed on the upper side into a thick parasol, to prevent the Sun from drinking up the moisture of the soil in which they grow; and they are divided, on the under side, into thin leafy plates, for receiving the vapours which exhale from the ground, nearly as those of the horizontal wheel of a fire engine receives the steam of the boiling water which makes it to turn about. They have, besides, several other means of watering themselves by these exhalations. There are many numerous species, lined with tubes, others are stuffed with sponges. There are some whose pedicle is hollow inwardly, and which, bearing a chapter atop, there collect the emanations of their soil, as in an alembic. Thus, there is not a particle of vapour in the Universe that goes to waste.

What has just now been said of the inverted forms of mushrooms, of their leafy plates, of the tubes and sponges with which they are lined, for receiving the vapours exhaled from the ground, confirms what was advanced respecting the use of the leaves of mountain plants, hollowed into gutters, or constructed into the form of a pencil, or of a fan, for receiving the waters of Heaven. But aquatic plants, which had no need of such recipients, because they thrive in water, have, if I may so express myself, a repulsive foliage. I shall here present an object of

comparison, calculated to produce conviction of the truth of those principles : For example, the mountain box tree, and the caper plant of the rocks, have their leaves hollowed into a spoon form, with the concavity turned toward Heaven ; but the vaccinium of the marshes, (cranberry) or *vaccinia palustris*, which is likewise furnished with concave leaves, bears them inverted, with the cavity turned toward the earth. From this negative character, I was enabled to distinguish, as a plant of the marshes, a very rare plant in the Royal Garden, which I saw for the first time. It is the *latum palustre*, which grows in the marshes of the Labrador country. Its leaves, formed like little coffee spoons, are all inverted ; their convex side being turned toward Heaven. The water lentil of our marshes, as well as the typha of our rivers, has the middle of its leaf swelled.

Botanists, on observing leaves nearly similar in plants, on the brink of the water, and on the heights of mountains, never entertained a suspicion, that they could answer purposes so different. Many of them, no doubt, are persons of profound erudition ; but their learning is rendered entirely useless to them, because their method constrains them to proceed in one single track, and their system indicates to them only one kind of observations. This is the reason that their most numerous collections, frequently, present nothing but a mere vocabulary. The study of Nature is spirit and intelligence simply. Her vegetable order is an immense volume of which plants form the thoughts, and the leaves of those very plants, the letters. Nay, there is not a very great number of primitive forms in the characters of this alphabet : But by means of their various assemblages, she forms, as we do with ours, an infinite number of different thoughts. As it is with language, in order totally to alter the meaning of an expression, all that she has in many cases, to do, is to change an accent. She places rushes, reeds, arums with a sleek foliage and a full pedicle, on the banks of rivers ;

She traces an aqueduct in the leaf, and transforms them into rushes, reeds and arums of the mountains.

We must, at the same time, be carefully on our guard against generalizing these means; otherwise they will quickly betray us into a misapprehension of her procedure. For example, certain Botanists, having suspected that the leaves of some plants might very well be adapted for collecting the rain water, believed that they had a perception of this use in that of the *dipsacus*, or fullers' thistle. It was very easy to fall into a mistake here, for the leaves are opposite, and meet at their bases; so that after it has rained, they present reservoirs, which contain, one with another, a good half glass of water, and which are disposed in stories along its stem. But they ought to have considered, first, that the *dipsacus* grows naturally on the brink of waters, and that Nature does not bestow cisterns of water on aquatic plants. This would be, according to the proverb, to carry water to the river. Secondly, they might have observed, that the tiers formed by the opposite leaves of the *dipsacus*, so far from being reservoirs, are, on the contrary, dischargers, which convey off the rain water from its roots, to the distance of nine or ten inches, on every side, by the extremities of its leaves. They resemble, in some respects, the gutters which project from the roofs of our houses, or those which are formed by the corners of our hats, which serve to carry away the rain water from the body, and not to throw it inward. Besides, the water which remains in the cavity of the leaves of the *dipsacus* never can get down to the root of the plant, for it is detained there, as at the bottom of a vase. It would not even be proper for moistening it, for *Pliny* insists that it is brackish. The birch wort, which grows in the trembling and frothy marshes of Canada, carries, at its base, two leaves, formed like the halves of a trumpet sawed asunder lengthwise. They are both concave, but have, at the extremity that is farthest from the plant, a kind of bill, shaped like a spout. The water which re-

mains in the receivers of these aquatic plants, is, perhaps, destined to supply drink to the small birds, which sometimes find themselves not a little embarrassed how to come at it, in the time of inundations.

It is necessary carefully to make a distinction between the elementary, and the relative, characters of plants. Nature obliges the man who studies her, not to hold to external appearances, and, in order to form his understanding, she makes him rise from the means which she employs, to the ends which she proposes. If certain aquatic plants seem to present, in their foliage, some of the characters of mountaineers, there are upon the mountains, some which seem to present characters similar to those of the waters; such, for example, is the broom. It bears leaves so small, and so few in number, that they appear insufficient for collecting the water necessary to its growth, and so much the more, that it thrives in soils the most parched. Nature has indemnified it in another manner. If its leaves are small, its roots are very long. They go in quest of coolness to a great distance. I have seen some of them extracted from the earth, which were more than twenty feet in length, and it was necessary, after all, to break them off, it being impossible to reach the extremities. This prevents not the scanty leaves from exhibiting the mountain character; for they are concave, they point toward Heaven, and are lengthened out, like the under bill of a bird.

The greatest part of aquatic vegetables throw the water off from them, some by their port; such as the birch, the branches of which, so far from rearing themselves toward Heaven, fall downward, in form of an arch. The same thing may be affirmed of the great chestnut and of the walnut, unless these trees should have changed their natural attitude, by growing in thirsty situations. Their bark is usually sleek, as that of the birch, or scaly, like that of the chestnut; but not hollowed into canals, as that of the elm, or the mountain pine. Others have in themselves a

repulsive quality : Such are the leaves of the nymphæa, and of several species of colewort, on which the drops of water collect into globules, like the particles of quicksilver. Nay, there are some which it is extremely difficult to moisten, such as the stems of many species of capillary plants. The laurel, we are told, carries its repulsive quality to such a degree, as to repel the thunder. If this quality, so highly extolled by the Ancients, is really possessed by the laurel, we must, undoubtedly, ascribe this to its nature as a fluviatic plant. The laurel grows in abundance on the banks of the rivers of Thessaly. A traveller, whose name is the *Sieur de la Guilletière*,* says, in a relation written in a very lively and agreeable manner, that he never saw any where such fine laurels as along the side of the river Peneus. Hence, perhaps, was suggested the idea of the metamorphosis of *Daphne*, the daughter of that river deity, transformed by *Apello* into a laurel.

This repulsive property of certain trees, and of some aquatic plants, induces me to think that they might be employed around our habitations, as a security against thunder storms, and that in a manner more certain, and much more agreeable, than electrical conductors, which dissipate, only by attracting them to the neighbourhood. They might farther be very advantageously employed for drying marshy grounds ; as the attractive qualities of many mountain vegetables, might be used in forming fountains upon heights, by collecting there the vapours which float in the air. There is not, perhaps, an infectious morass on the Globe, except in places where men have injudiciously destroyed the plants whose roots absorbed the humidity of the Earth, and whose foliage repelled that of the Heavens.

I pretend not to affirm, however, that the foliage of aquatic plants has no farther uses : For where is the man who has entered into the endless views of Nature ? “ To

* See the Voyage to Lacedemon, by the *Sieur de la Guilletière*.

“ whom hath the root of wisdom been revealed ? or, Who hath known her wise counsels ?” *Radix sapientiæ cui revelata est ? et astutias illius quis agnovit ?** In general, the leaves of aquatic plants appear, from their extreme mobility, very much adapted to the purpose of renewing the air of humid places, and of producing, by their movements, that drying of the ground to which I have just alluded. Such are those of reeds, of poplars, of aspens, of birches, and even of willows, which are sometimes in motion, though there is not the slightest degree of wind perceptible.

It is farther remarkable, that most of these vegetables emit a very pleasing smell ; among others, the poplar and the birch, especially in the Spring ; and that a great number of aromatic plants thrive by the water’s side, as mint, sweet marjoram, ciperus, the sweet smelling rush, the iris ; the *calamus aromaticus* : And, in the Indies, the spice plants, such as the cinnamon tree, the nutmeg and the clove. Their perfumes must contribute very powerfully to diminish the mephitic exhalations, which are natural to marshy and humid places. They have, likewise, many uses relatively to animals, such as affording a shade to the fishes which resort thither, in quest of a shelter from the scorching heat of the Sun.

But one conclusion we may certainly deduce, in favour of our improvements in culture, from the observations now made ; namely this, that in the cultivation of plants, the pedicle of whose leaves presents no impress of a canal, it is necessary to water them copiously ; for, in this case, they are naturally aquatic. The nasturtium, the mint, and the sweet marjoram, consume a prodigious quantity. But when plants are provided with a canal, they must be watered more sparingly, for this demonstrates them to be originally natives of the mountains. The deeper this canal is, the less artificial watering do they re-

* Ecclesiasticus, chap. i. ver. 6.

quire. Every gardener knows, that if you frequently water the aloës, or the taper of Peru, you will kill them.

The seeds of aquatic plants have forms not less adapted, than those of their leaves, to the places where they are destined to grow; they are all constructed in a manner the most proper for sailing off. Some of them are fashioned into the figure of shells, others into boats, rafts, skiffs, single and double canoes, similar to those of the South Seas. I can have no doubt, that, by an attentive study of this part alone, a great number of very curious discoveries might be made, respecting the art of crossing currents of every sort; and I am persuaded that the first men, who were much better observers than we are, copied their different methods of travelling, by water, after those models of Nature, of which we, with all our pretensions to discovery, are but feeble imitators.

The aquatic, or maritime pine, has its kernels inclosed in a kind of little bony shoes, notched on the under side, and covered over, on the upper, with a piece resembling a ship's hatch. The walnut, which delights so much in the banks of rivers, has its fruit contained in two little boats, whose apertures are perfectly fitted to each other. The hazel, which becomes so bushy on the brink of rivulets; the olive, which is enamoured of the sea shore to such a degree, that it degenerates in proportion as you remove it thence, carry their seed inclosed in a species of little casks, capable of holding out the longest voyages. The red berry of the yew, whose favourite residence is the cold and humid mountain, by the side of a lake, is hollowed into a little bell. This berry, on dropping from the tree, is at first carried down, by its fall, to the bottom of the water; but it returns instantly to the surface, by means of a hole, which Nature has contrived, in form of a navel, above the seed. In this aperture is lodged a bubble of air, which brings it back to the surface of the water, by a mechanism more ingenious than that of the div-

er's bell, in this, that the vacuum of the diving bell is undermost, and in the berry of the yew it is uppermost.

The forms of the seeds of aquatic plants are still more curious; for, universally, Nature redoubles her skill and exertions in favour of the little and the weak. That of the bulrush resembles a lobster's eggs; that of fennel is a real canoe in miniature, hollowed in the middle, with both ends raised into a prow. There are others grooved into each other resembling pieces of wood disposed for a float, and worm eaten; such are those of the horned poppy. Those which are destined to thrive on the brink of waters destitute of current, are wafted by sails; such is the seed of a scabious plant of our own country, which grows on the border of morasses. Besides, the difference of this from the other species of scabious, whose seeds are crowned with pronged hairs, in order to fasten themselves on the hairs of the animals which transplant them, the one, last mentioned, is overtopped by a half bladder open, and resting on its summit like a gondola. This half bladder serves it, at once, as a sail by water, and as a vehicle by land. These means of natation, though endlessly varied, are common, in all climates, to the grains of aquatic plants.

The almond of the river of the Amazons, known by the name of *totoca*, is inclosed in two shells, exactly similar to those of an oyster. Another fruit on the strand of the same river, which abounds in almond trees, has a perfect resemblance in colour and form, to an earthen pot, with its little lid;* it goes by the name of the monkey's porridge pot. Others are formed into large bottles, as the fruit of the great gourd. There are seeds incruited in a coat of wax, which makes them float, such are the berries of the wax tree, or royal pimenta of the shores of Louisiana. The formidable apple of the mancenilla, which grows on the

* See engravings of most of those seeds, in *John de Laet's History of the West Indies*.



LEAVES WITHOUT AN AQUEDUCT, & NAUTICAL
FRUITS OF VEGETABLES OF THE SHORE.



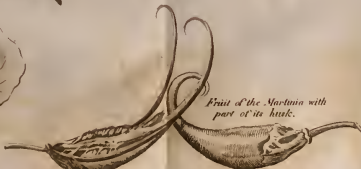
Leaf & Seeds
of Fenikel



Leaf & Fruit
of the Walnuttree.



Leaf & Fruit of the Martima
of the shores of la Vera Cruz



Fruit of the Martima with
part of its husk.



Leaf &
Seeds of the
Nasturtium

sea shore of the islands situated between the Tropics, and the fruit of the manglier, which grows there actually in the salt water, are almost ligneous. There are others with shells similar to the sea urchin, without prickles. Many are coupled, and perform their voyage like the double canoe, or balse, of the South Sea. Such is the double cocoa of the Sechelles Islands.

If you examine the leaves, the stems, the attitudes and the seeds of aquatic plants, you will always remark in them characters relative to the places where they are destined to grow, and in harmony with each other; so that, if the seed has a nautical form, its leaves are deprived of an aqueduct; just as in mountain plants, if the grain is volatile, the pedicle of the leaf, or the leaf altogether, presents a channel.

I shall assume, as an instance of the nautical harmonies of plants, the nasturtium, with which every one is acquainted. This plant which bears flowers so agreeable, is one of the cresses of the rivulets of Peru. It must be observed, first, that the foot stalks of its leaves have no conduit, like those of all aquatic plants; they are inserted in the middle of the leaf, which they support like an umbrella, to ward off from them the water which falls from Heaven. Its seed, when fresh, has exactly the form of a boat. The upper part is raised into a slope, like a bridge to let the water run off; and you distinguish perfectly, in the lower part, a poop and a prow, a keel and a bottom. (*See the annexed Plate.*) The little furrows of the seed of the nasturtium are characters common to most nautical grains, as well as the triangular forms, and those of the kidney or keel. Those furrows, undoubtedly, prevent them from rolling about in all directions, constrain them to float along lengthwise, and give them the direction the best adapted to the track of the water, and to the passage of the narrowest straits. But they have a character still more general; it is this, that they swim in their state of maturity, which is not the case with grains

destined to grow in the plains, such as pease and lentils, which sink to the bottom.

Some species of these, nevertheless, such as the French bean, sink, at first, to the bottom, and rise to the surface when penetrated with the water. Others, on the contrary, float at first, and sink afterward. Such is the Egyptian bean, or the seed of the colocasia, which grows in the waters of the Nile. In order to sow it, you are under the necessity of rolling it up in a ball of earth; and in that state it is thrown into the water. Without this precaution, not one would remain on the shores where you would wish it to grow. The natibility of aquatic seeds is, undoubtedly, proportioned to the length of the voyages which they have to perform, and to the different gravity of the waters in which they are destined to swim. There are some which float in sea water, and sink in fresh, which is lighter than sea water by one thirty second part: Such precision is in the balancing of Nature! I believe that the fruit of the great India chefnut, which thrives on the shores of the salt creeks of Virginia are in this situation. In a word, I am so entirely convinced of all the relations which Nature has established among her Works, as to conclude, that the time when the seeds of aquatic plants drop, is regulated, in most cases, by that of the overflowing of the rivers where they grow,

It is a speculation well worthy of the attention of the philosophic mind, to trace those vegetable fleets sailing along, night and day, with the current of the rivulets, and arriving, undirected by any pilot, on unknown regions. There are some which, by the overflowing of the waters, now and then lose themselves in the plains. I have seen them, sometimes accumulated upon each other, in the bed of torrents, presenting around the pebbles where they had germinated, waves of verdure of the most beautiful sea green. You would have thought that *Flora*, pursued by some River god, had dropped her basket in the urn of that Deity. Others more fortunate, issuing from the sources of

some stream, are caught by the current of the greater rivers, and conveyed away to embellish their distant banks with a verdure not their own.

There are some which cross the vast Ocean ; and, after a long navigation, are driven, by the very tempests, on the regions which they adorn and enrich. Such are the double cocoas of the Sechelles, or Mahé Islands, which the Sea carries regularly every year a distance of four hundred leagues, and lands them on the coast of Malabar. The Indians, who inhabit it, were long under the persuasion, that those annual presents of the Ocean must have been the produce of a palm tree that grew under its billows. They gave them the name of marine cocoa nuts ; and ascribed wonderful virtues to them. They set as high a value upon them as upon ambergris ; and to such a pitch was this extravagance carried, that many of those fruits have been sold as high as a thousand crowns a piece. But the French having, some years ago, discovered the Island of Mahé, which produces them, and which is situated in the fiftieth degree of South Latitude, imported them in such quantities to India, that they sunk at once in value and in reputation ; for men, in every country, prize those things only which are rare and mysterious.

In every island where the eye of the traveller has been able to contemplate the primordial dispositions of Nature, he has found their shores covered with vegetables, all the fruits of which possess nautical characters. *James Cartier* and *Champlain* represent the strands of the lakes of North America as shaded by stately walnut trees. *Homer*, who has so attentively studied Nature, at times, and in places, where she still retained her virgin beauty, has planted the wild olive along the shores of the island on which *Ulysses*, floating upon a raft, is thrown by the tempest. The navigators who have made the first discoveries in the seas of the East Indies, frequently found in them shallows planted with cocoa trees. The Sea throws such quantities of fennel seed on the shores of Madeira, that

one of its bays has obtained the name of Funchal, or Fernel Bay.

It was by the course of those nautical seeds, too carelessly observed by modern Seamen, that the Savages formerly discovered the islands to windward of the countries which they inhabited. They formed conjectures respecting a tree at a great distance, on seeing its fruit cast upon their shores. By similar indications, *Christopher Columbus* acquired the assurance, that another world existed. But the regular winds and currents from the East, in the South Sea, had carried them long before to the Nations of Asia; of which I shall say something toward the end of this Study.

There are, besides, vegetables of an amphibious nature. They are disposed in such a manner, that one part of their foliage raises itself toward Heaven, and the other forms an arcade, and bends downward to the ground. Nature has given to their seeds, likewise, the power of at once flying and swimming. Such is the willow, the seed of which is enveloped in a cobweb down, which the winds transport to a great distance, and which floats along the surface of the water, without wetting itself, like the downy feathers of the duck. This down is composed of small capsules, like the bottom of a lamp, and with two beaks, filled with seeds, which are crowned with a plume: So that the wind conveys those capsules through the air, and likewise transports them, by sailing, along the face of the water. This configuration was admirably adapted, to be the vehicles of the seeds of plants which grow by the side of stagnant waters and lakes. The same thing holds as to the seeds of the poplar; but those of the alder, which grows on the banks of rivers, have no plumage, because the current of the stream is designed to convey them from place to place.

The seeds of the fir, and of the birch, have, at once, volatile and nautical characters; for the fir has its kernel attached to a membranous wing; and the birch has its

grain embraced by two wings, which give it the appearance of a little shell. These trees grow, at once, on the wintry mountains, and on the margin of the lakes of the North ; their seeds had occasion not only to sail over stagnant waters, but to be transported through the air over the snows, in the midst of which they take delight. I have no doubt that there may be species of these trees, the seeds of which are altogether nautical. Those of the linden tree are carried in a spherical body, similar to a little bullet. This bullet is affixed to a long tail, from the extremity of which descends obliquely a follicle of considerable length, whereby the wind carries it away to a great distance, spinning it round and round. When it drops into the water, it plunges about the length of an inch in it, and serves, in some sort, as ballast to its tail, and to the little leaf attached to it, which thus, being brought to a vertical situation, performs the functions of a mast and a sail. But the examination of so many curious varieties would carry me too far.

This would be the proper place to speak of the roots of vegetables ; but I am little acquainted with what passes under ground. Besides, in all Latitudes, on heights, as well as by the water's side, we find the same substances nearly, muds, sands, pure mould, rock, which must produce a much greater resemblance in the roots of plants than in the other parts of their vegetation. I have no doubt, however, that Nature has established, on this subject, relations, the knowledge of which would be highly useful, and that a cultivator, somewhat experienced, might be able, by inspecting the root of a vegetable, to determine the species of soil best adapted to it. Those which are very hairy seem most proper for sandy grounds. The cocoa tree, which grows to a very large size on the shores of the Torrid Zone, thrives in pure sand, which it interlaces with such a prodigious quantity of hairy fibres, as to form a solid mass around it. It is on this basis that it effectually resists the most violent tempests, in the midst

of a moving soil. What is singularly remarkable in the case of this plant, it never succeeds so well as in the sand on the sea shore, and generally languishes in the interior of a country.

The Maldivia Islands, which are, for the most part, nothing but sandy shallows, are the most renowned regions of all Asia, for the abundance and the beauty of their cocoa trees. There are other vegetables of the shores, the roots of which are drawn out like cords. This configuration renders them exceedingly proper for binding together the ground, and thereby defending it against the inroads of the watery element. Such are, among ourselves, the alder, the reed, but, above all, a species of dogs' grass, which I have seen very carefully cultivated in Holland along the dikes.

Bulbous plants appear, in like manner, to take pleasure in soft muds, into which they cannot penetrate very far, from the roundness of their bulbs. But the elm extends its roots at pleasure on the declivity of the mountain; and the oak inserts his sturdy pivots into it, to lay hold of the successive strata of which it is composed. Other plants preserve, on the high grounds, by their creeping foliage and their superficial roots, the emanations of dust which the winds there deposit. Such is the *anemone nemorosa*. If you find a single foot of it on a hill, in a wood not greatly frequented, you may rest assured, that it diffuses itself like a net work through the whole extent of that wood.

There are trees, the trunks and the roots of which are admirably contrasted with obstacles which appear to us accidental, but which provident Nature foresaw. For example, the cypress of Louisiana grows with its foot in the water, chiefly on the banks of the Méchassipi, whose vast shores it magnificently shades. It rises there to a height which surpasses that of almost any of the trees of Europe.*

* See Father Charlevoix's History of New France, vol. iv.

Nature has given to the trunk of this stately tree, a circumference of more than thirty feet, in order to enable it to resist the ices from the lakes of the North, which discharge themselves into that river, and the prodigious rafts of timber which float down its stream, and which have obstructed most of its mouths to such a degree, as to interrupt the navigation to vessels of any considerable burthen. And, to put it beyond a doubt, that she designed the thickness of its trunk for withstanding the shock of floating bodies, it is remarkable, that, at the height of six feet, she suddenly diminishes the size of it at least a third, the full magnitude having become superfluous at that degree of elevation : And for the purpose of securing it in another manner, still more advantageous, she raises out of the root of the tree at four or five feet distance all around, several large stumps from one foot to four feet high. These are not shoots ; for their head is smooth, and bears neither leaves nor branches : They are real ice breakers.

The tupelo, another great tree of Carolina, which grows likewise by the water's side, but in creeks, has nearly the same dimensions at its base, excepting the ice breakers, or pallifades. The seeds of those trees are fluted, as I have already observed to be the case with aquatic seeds in general ; and that of the cypress of Louisiana differs considerably, by its nautical form, from that of the cypress of the mountains of Europe, which is volatile. These observations are so much the more worthy of credit, that Father *Charlevoix*, who, in part, relates them, deduces no consequence whatever from the facts, though he was abundantly capable of interpreting their use.

It must now be apparent of what importance it is to connect the study of plants with that of the other Works of Nature. It is possible to ascertain, by their flowers, the exposure to the Sun which is best adapted to them : By their leaves, the quantity of water that is necessary to them ; by their roots, the soil which is most suitable ; and by their fruits, the situations in which they ought to be

placed, together with new relations to the animals which feed upon them. By fruit I mean, as Botanists likewise do, seed of every species.

The fruit is the principal character of the plant. Of this we may form a judgment, first, from the care which Nature has bestowed on its formation and preservation. It is the ultimate term of her productions. If you examine, in a vegetable, the different envelopes which inclose its leaves, its flowers, and its fruits, you will perceive a most wonderful progression of pains and precautions. The simple leaf buds are easily distinguishable from the simplicity of their cases. Nay, there are plants which have none at all, as the shoots of the gramineous, which start immediately out of the earth, and stand in no need of any foreign protection. But the buds which contain flowers are provided with sheaths, or lined with down, as those of the apple tree ; or cased over with glue externally, as those of the great India chestnut ; or are inclosed in bags, as the flowers of the narcissus ; or secured in some way or another, so as to be very distinguishable, even before their expansion.

You afterwards perceive, that the care employed in dressing out the flower, was entirely destined to the fecundation of the fruit ; and that when this is once formed, Nature redoubles her precautions, both externally and internally, for its preservation. She gives it a placenta, she envelops it in pellicles, in shells, in pulps, in pods, in capsules, in husks, in skins, and sometimes in a case of thorns. A mother cannot pay more attention to the cradle of her infant. In process of time, in order that her grown child may be enabled to go abroad, and look for a settlement in the world, she crowns it with a tuft of plumage, or incloses it in a shell : Furnishes it with wings to fly away through the air, or with a bark to sail off along the face of the water.

There is something still more marked, to arrest our observation, in favour of the fruit. It is this, that Nature

frequently varies the leaves, the flowers, the stems, and the roots of a plant ; but the fruit remains constantly the same, if not as to its form, at least as to its essential substance. I am persuaded that, when she was pleased to create a fruit, it was her intention that it should have the power of reproducing itself on the mountains, in the plains, amidst rocks, in sands, on the brink of waters, and under different Latitudes ; and, in order to adapt it to its situation, she varied the watering pot, the mirror, the prop, the attitude, the buttress, and the fur of the vegetable, correspondingly to the Sun, to the rains, to the winds and to the soil. To this intention, I believe, we ought to ascribe the prodigious variety of species in every genus, and the degree of beauty which each attains, when in the situation that is natural to it. Thus, in forming the chestnut to reach perfection on the stony mountains of the South of Europe, and to supply the want of corn, which scarcely succeeds there, she placed it on a tree which in those regions attains magnificence from its adaptations.

I have eaten of the fruit of the chestnut tree of the Island of Corfica. It is as large as small hens' eggs, and makes excellent food. You may read, in a modern traveller, the description of a chestnut tree, which grew in Sicily, on one of the ridges of Mount *Ætna*. Its foliage is of such extent, that a hundred cavaliers could repose with ease under its shade. For that reason it obtained the name of *centum cavallo*. Father *Kircher* assures us, that he had seen, on the same mountain, in a place called *Trecaſtagne*, three chestnut trees of such a prodigious size, that when they were felled, you might have lodged a large flock of sheep under covert of their bark. The shepherds employed them for this purpose, in the night time, and in bad weather, instead of penning up their charge in the fold. Nature has granted, to this stately vegetable, the faculty of collecting, on the steep mountains, the waters of the Atmosphere, by means of leaves formed like so many tongues ; and of penetrating, by means of its sturdy roots,

down to the very bed of fountains in despite of lavas and rocks.

Nature has been pleased, elsewhere, to produce the fruit of this tree with a degree of bitterness, for the use of some animal no doubt, on the brink of the salt water creeks, and arms of the Sea, in Virginia. She has bestowed on the tree which bears it, leaves disposed in form of a tile, a scaly bark, flowers different from those of the European chestnut tree, but adapted, unquestionably, to the humid exhalations, and to the aspects of the Sun to which it is exposed. In a word, she has transformed it into the great India chestnut. It arrives at much greater beauty in its native country, than in Europe. That of America is the maritime chestnut tree; and that of Europe is the chestnut tree of the mountains. She has placed, perhaps by a different kind of combination, this fruit, on the beech tree of our hills, the mast of which is evidently a species of chestnut.

Finally, by means of one of those maternal attentions which have induced her to suspend, even on herbs, the productions of trees, and to serve up the same dishes on the smallest tables, she has placed before us the same fruit in the grain of the black corn, which, in its colour, and its triangular form, resembles the seed of the beech, called in Latin *fagus*, whence this species of corn has obtained the name of *fagopyrum*. One thing, at any rate, is certain, namely, that independent of the mealy substance, we find, in the black corn, in the beechmast, and in the chestnut, similar properties, such as that of cooling excessive heat of urine.*

It was, in like manner, the intention of Nature to produce the acorn, in a great variety of exposures. *Pliny* enumerated, in his time, thirteen different species in Europe, one of them, which makes very excellent food, is that of the green oak. It is of this that the Poets speak,

* See *Chomel's Treatise on Common Plants.*

when they celebrate the felicity of the Golden Age, because its fruit then served as an aliment to Man. It is worthy of being remarked, that there is not a single genus of vegetable, but what gives in some one of its species, a substance capable of being converted into nourishment for mankind. The acorn of the green oak is, among the fruits of this genus of trees, the portion reserved for our use. Nature has been pleased, after making this provision for Man, to scatter the other species of the oak over the different soils of America, to supply the necessities of her other creatures. She has preserved the fruit, and has varied the other parts of the vegetable. She has placed the acorn, but with the leaves of the willow, on the plant, which has, for that reason, got the name of the willow leafed oak, and which thrives in that country by the water's side.* She has placed it, together with small and pendent leaves affixed to pliant tails, like those of the aspin, on the water oak, which grows there in the marshes. But when she intended to plant them in dry and parched soils, she united to them leaves of ten inches in breadth, adapted to the reception of rain water, such are those of the species known by the name of the black oak in that country.

It may be necessary farther to observe, that the place where any species of plant produces the finest fruit, determines its principal genus. Accordingly, though the oak has its species scattered about every where, it must be considered as of the genus of mountain trees ; because that which grows on the mountains of America, and there distinguished by the name of the chestnut leafed oak, yields the largest acorns, and is one of the greatest trees in that part of the world ; whereas the water oak, and the willow leafed oak, rise to no great height, and produce very small acorns.

* See the figures of it in *Father Charlevoix's History of New France*, vol. iv.

The fruit as we have seen, is the invariable character of the plant. To it, accordingly, Nature has likewise attached the principal relations of the animal kingdom to the vegetable kingdom. It was her intention that an animal of the mountains should find the fruit, on which he has been accustomed to live, in the plains, on the sand, among the rocks, when he is under the necessity of changing his country, and especially on the brink of rivers, when he descends thither to quench his thirst. I am not acquainted with a single mountain plant but what has some of its species, with their corresponding varieties, scattered over all situations, but principally on the margin of waters.

The mountain pine has its kernels mounted on wings, and the aquatic pine has its seed inclosed in a skiff. The seeds of the thistle, which grows on a parched soil, are furnished with plumes, to convey them from place to place : Those of the fullers' thistle, which thrives by the water's side, have none, because they had no occasion for any to assist them in swimming. Their flowers vary for similar reasons ; and though Botanists have made two different genera of them, the goldfinch fails not to acknowledge this last as a real thistle. He rests himself upon it, when he finds it convenient to go and cool himself on some watery bank. He forgets, on beholding his favourite plant, the sandy downs where he was born, and cheers the banks of the rivalet, with the music of his song, and the beauty of his plumage.

It appears to me impossible to acquire any thing like a knowledge of plants, unless by studying their geography, and their ephemeris. Without this double illumination, which mutually reflects, their forms will be forever strange to us. The greatest part of Botanists, however, pay no manner of regard to this. In making their collections, they remark not the season at which plants grow, nor the place where, nor the aspect to which they are exposed. They carefully attend to all their intrinsic parts, and es-

pecially to their flowers ; and after this mechanical examination, deposit them in their herbary, and imagine they have a thorough knowledge of them, especially if they have had the good fortune to dignify them, by imposing some Greek name. They resemble a certain hussar, of whom I have heard, who, having happened to find a Latin inscription in brazen characters, on an antique monument, disengaged them one after another, and tumbled them together into a basket, which he dispatched to an Antiquarian of his friends, with a request that he would inform him what they meant. They no more lead us to an acquaintance with Nature, than a Grammarian would give us a relish for the genius of *Sophocles*, by presenting us with a naked catalogue of his tragedies, of the division of their acts and scenes, and of the number of verses which compose them. With equal absurdity are they chargeable who collect plants, without marking their relations to each other, and to the elements ; they scrupulously preserve the letter, but suppress the sense of it. Far different was the manner in which a *Tournefort*, a *Vuillant*, a *Linnaeus*, prosecuted the study of Botany. If these learned men have not deduced any consequence from those relations, they have, at least, prepared the projecting stones of expectation, which promise the construction of a future fabric of science.

Though the observations which I have just made, respecting the elementary harmonies of plants, are but few in number, I have the confidence to affirm, that they are of very high importance to the progress of agriculture. The point in question is not to determine geometrically the genera of flowers, whose mirrors are the best adapted for reflecting the rays of the Sun in every point of Latitude ; the glory of calculating their curves is reserved for future *Newtons*. Nature has outrun our most ardent wishes, in those places where she has been left at liberty to reestablish her own plans. We have it in our power to secure prosperity to ours, in a manner the most beneficial, by re-

ducing them into harmony with hers. In order to ascertain what plants are best adapted to succeed in such and such a district, you have only to pay attention to the wild plants which thrive there spontaneously, and which are distinguishable for their vigor and for their multitude: Then substitute in their place domestic plants, which have the same kind of flowers and leaves. Wherever umbelliferous plants grow, you may put in their room such of our culinary vegetables as have most analogy with them, from their leaves, their flowers, their roots and their grains, such as the daucus genus: The artichoke will there usefully replace the gaudy thistle; the domestic plum tree ingrafted on a wild stock of the same plant, in the very place where this last spontaneously sprung up, will become extremely vigorous. I am persuaded that by these natural approximations, advantage might be derived from the most barren sands and rocks; for there is not a single genus of wild plants but what contains a species fit for food.

But it was not sufficient for Nature to have established so many harmonies between plants, and the situations in which they were destined to vegetate, had she not likewise provided means for restoring them, when destroyed by the intolerant culture of Man. Let a piece of ground be left uncultivated, for ever so short a space of time, and you will presently see it clothed with vegetables. They grow there in such numbers, and so vigorously, that there is no husbandman capable of producing an equal quantity, on the same spot, let him take what pains he will. These shoots, however, so vigorous and so rapid, which frequently take possession of our dock yards of free stone, of our walls of ashlar, and of our courts paved with granite, are, in many cases, only a provisional culture. Nature, who is always advancing from harmony to harmony, till she has attained that point of perfection which she proposed to herself, sows, at first, with grasses and herbage of different species, all abandoned soils, waiting for an opportunity of exerting her powers, to raise on that very

spot vegetables of a higher order. On the rude neglected districts, where barren downs alone meet our eyes, posterity may behold stately forests arise.

We shall throw, as our custom is, a superficial glance on the very ingenious methods which Nature employs for preparing and conducting those vegetable progressions. We shall hence attain a glimpse, at least, not only of the elementary relations of plants, but of those which exist between their different classes, and which extend even to the animal kingdom. Vegetables, which are the most contemptible in the eyes of Man, are frequently the most necessary in the order of Creation.

The principal means employed by Nature for securing the growth of plants of every species, are the thorny plants. It is very remarkable, that plants of this description are the first which appear on lands in fallow, or in forests which have been cut down. They are, in truth, wonderfully well adapted to promote foreign vegetations, because their leaves with deep incisions, like those of the thistle and echium, or their sprigs bent into an arch, as those of the bramble, or their horizontal and interlaced branches, like those of the black thorn, or their boughs bristled with briars and unprovided with leaves, as those of the sea rush, leave underneath and around them many intervals through which other vegetables may arise, and find protection from the tooth of most quadrupeds. Nurseries of trees are frequently to be found in their bosom. Nothing is more common in coppice woods than to see a young oak start out of a tuft of brambles, which enamels the earth all around, with its clusters of prickly flowers; or a young pine arise out of a yellow brake of marine rushes.

When these trees have once acquired a certain degree of growth and size, they stifle, by their shade, those thorny plants, which subsist no longer, except along the skirts of the woods, where they enjoy air sufficient for their vegetation. But in this situation, such plants are still going

on to extend the empire of their superiors, from year to year, over the plains. Thus, the thorny plants are the original cradles of the forests; and the scourge of the agriculture of Man, is the bulwark of that of Nature.

Man has, however, imitated, in this respect, the processes of Nature; for if he wishes to protect the newly sown seeds of his garden, he finds it frequently necessary to cover them with prickly branches of one sort or another. It appears to me probable, that there is not a heath but what, in time, might become a forest, were their commoners restrained from driving their flocks thither to pasture, for the cattle crop the tender shoots of the trees as fast as they spring up. This, in my opinion, is the reason why the declivities of the lofty mountains of Spain, of Persia and of many other parts of the World, are not clothed with trees: It is because of the numerous flocks of sheep which are driven thither, in Summer, and which roam over their different chains. I am fully convinced that those mountains were covered, in the earlier ages of the World, with forests which were laid low by their first inhabitants; and that they would resume their ancient clothing, though now naked and desert, were the cattle to pasture on them no longer. It is very remarkable, that those elevated regions are sowed over with prickly plants, just as our heaths generally are.

Don *Garcias de Figueroa*, Ambassador from Spain at the Court of *Cha Abas*, King of Persia, relates, in the account which he has given of his journey, that the lofty mountains of Persia, which he crossed, and where the Turcomans are continually straying, as they tend their fleecy charge, were covered with a species of thorny shrub, which grew luxuriantly in the most parched situations. This same shrubbery served as a retreat to a great number of partridges.

From this circumstance we take occasion to observe, that Nature employs the birds, particularly, to sow the thorny plants in places the steepest and most inaccessible.

They are accustomed to retire thither in the night, and there deposit, with their dung, the stony seeds of the bramble berry, of the berry of the eglantine, of the barberry and of most thorny shrubs, which, from relations no less wonderful, are indigestible in their stomach.

Birds have, besides, particular harmonies with those vegetables, as we shall make appear in its proper place. Not only do they find on them a plentiful supply of food, and shelter under them, but downs for lining their nests, as on thistles, and on the cotton tree of America; so that if many of them resort for safety to the elevation of towering trees, others find it in the thorny brake. There is not a single bush but what has its peculiar bird.

Independently of the plants proper to each situation, and which are there domesticated, there are some in a state of incessant peregrination, and flit round the earth, without settling in any fixed abode. We can easily have a conception of the cause of this constant removal, by supposing, what is actually the truth, that several of such plants shed their seeds only at the season when certain regular winds blow, or at certain revolutions of the currents of the Ocean. Whatever may be in this, I am of opinion that we must rank, under this description, many plants which were known to the Ancients, but are not now to be found. Such, among others, is the celebrated *lazerpitium* of the Romans, the juice of which, called *lazer*, sold for its weight in silver. This plant, according to *Pliny*, grew in the vicinity of the city of Corenum, in Africa; but had become such a rarity in his time as hardly any where to be seen. He tells us that a single plant of it had been found, under the reign of *Nero*, and that it was sent to this Prince as a great curiosity.

Modern Botanists pretend, that the *lazerpitium* is the same plant with the *filphium* of our gardens. But they are evidently in an error, from the descriptions which the Ancients, and, among others, *Pliny* and *Dioscorides* have left us of it. For my own part, I have no doubt that the

lazerpitium is of the number of the vegetables which are destined to flit along the Earth, from East to West, and from West to East. It is, perhaps, at present, on the western shores of Africa, whither the easterly winds may have conveyed its seeds; perhaps, likewise, by the revolutions of the westerly winds, it may have returned to the place where it was in the days of *Augustus*; or it may have been conveyed into the plains of Ethiopia, among Nations totally unacquainted with its pretended wonderful qualities.

Pliny enumerates a great many other vegetables, which are, at this day, to us equally unknown. It may merit observation, that those vegetable apparitions have been contemporary with several species of flitting birds, which have likewise disappeared. It is well known that there are several classes of birds, and of fishes, which do nothing but migrate incessantly over the Earth and through the Seas; some, in a certain revolution of days; others, at the end of a certain period of years. Many plants may be subjected to a similar destiny. This Law extends even to the Heavens, in which some new star is, from time to time, making its appearance. Nature, as I think, has disposed her Works in such a manner, as to have always some novelty in reserve, in order to keep Man continually in exercise. She has established, in the duration of the existence of the different beings of each kingdom, concerts of a moment, of an hour, of a day, of a moon, of a year, of the life of a man, of the duration of a cedar, and, perhaps, of that of a globe: But this, undoubtedly, is known to the SUPREME BEING alone.

I am persuaded, at the same time, that the greatest part of flitting plants must have a principal centre, such as a steep rock, or an island in the midst of the Sea, from whence they diffuse themselves over all the rest of the world. This leads me to deduce, what I consider as an irrefragable argument in support of the recent Creation of our Globe; it is this, were the Globe of very remote

antiquity, all the possible combinations of the propagation of plants by seed, would have been already completed all over the World. Thus, for example, there would not be an uninhabited island and shore of the Seas of India, which you would not find planted with cocoa trees, and sown with cocoa nuts, which the Ocean wafts thither every year, and which it scatters alternately on their strands, by means of the variety of its monsoons and of its currents. Now, it is unquestionably certain, that the radiations of that tree and its fruit, the principal focusses of which are in the Maldivia Islands, are not hitherto diffused over all the islands of the Indian Ocean.

The Philosopher *Francis Leguat*, and his unfortunate companions, who were, in the year 1690, the first inhabitants of the small Island of Rodriguez, which lies a hundred leagues to the eastward of the Isle of France, found no cocoa trees in it. But, precisely at the period of their short residence there, the Sea threw upon the coast several cocoa nuts in a state of germination; as if it had been the intention of Providence to induce them, by this useful and seasonable present, to remain on that island, and to cultivate it.

Francis Leguat, who was unacquainted with the relations which seeds have to the element in which they are designed to grow, was very much astonished to find that those fruits, which weighed from five to six pounds, must have performed a voyage of sixty or fourscore leagues, without being corrupted. He took it for granted, and he was in the right, that they came from the Island of St. Brande, which is situated to the North East of Rodriguez. Those two desert islands had not, as yet, from the Creation of the World, communicated to each other all their vegetables, though situated in a current of the Ocean which sets in alternately, in the course of one year, for six months toward the one, and six months toward the other.

However this may be, they planted those cocoa nuts, which, in the space of a year and a half, sent out shoots

of four feet in height. A blessing from Heaven, so distinctly marked, had not the power of detaining them in that happy island. An inconsiderate desire of procuring for themselves women constrained them to abandon it, notwithstanding the remonstrances of *Leguat*, and plunged them into a long series of calamities, which few of them were able to survive. For my own part, I can entertain no doubt, that had they reposed that confidence in Providence which they had reason to do, its care would have conveyed wives for them into that desert Island, as it had sent to them the gift of the cocoa nut.

To return to the subject of vegetable navigation; all the combinations and the versatilities of their sowings, would have been long ago completed in islands lying between the same parallels, and in the same monsoons, if the World had been eternal. The double cocoa nuts, the nurseries of which are in the Sechelles Islands, would have diffused themselves, and would have had time to germinate on the Malabar coast, on which the Sea is from time to time throwing them. The Indians would have planted upon their shores those fruits to which they ascribed virtues so miraculous, while the palm tree, which bears them, was so entirely unknown but twelve years ago to the people of this coast, that they believed them to be natives of the bottom of the Sea, and thence gave them the appellation of marine cocoa nuts. There are, in like manner, a multitude of other fruits between the Tropics, of which the primordial stocks are in the Moluccas, in the Phillippines, in the islands of the South Sea, and which are entirely unknown on the coasts of both Continents, and even in the adjacent islands, which, undoubtedly, would have become there the objects of cultivation to their inhabitants, had the Sea been allowed sufficient time to multiply the projection of them on their shores.

I shall pursue this reflection no farther; but it evidently demonstrates the newness of the World. Were it eternal, and exempted from the care of a Providence, its veg-

etables would long since have undergone all the possible combinations of the chance which reſows them. We ſhould find their different ſpecies in every ſituation where it was poſſible for them to grow. From this obſervation I deduce another conſequence, namely this, That the AUTHOR of Nature evidently intended to link Mankind together, by a reciprocal communication of benefits, the chain of which is, as yet, very far from being completed. Where is, for example, the benefactor of Humanity, who ſhall tranſport to the Oſtiacs and the Samoïèdes of Waigat's Strait, Winter's tree from the Straits of Magellan, the bark of which unites the favour of cloves, of pepper and of cinnamon? And, Who is the man that ſhall convey to Magellan's Strait the peafe tree of Siberia, to feed the ſtarving Patagonian?

What a rich collection might Ruſſia make, not only of the trees which thrive in the northern and the ſouthern regions of America, but of thoſe which, in all parts of the World, crown the lofty, ice covered mountains, whoſe elevated ridges have a temperature approaching to that of her plains? Wherefore beholds ſhe not her forests enriched with the pines of Virginia, and with the cedars of Mount Lebanon? The deſert ſhores of the Irtis might every year clothe themſelves with the ſame ſpecies of oats wherewith ſo many Nations, inhabiting the banks of the rivers of Canada are principally ſupported. Not only might ſhe collect in her plains the trees and the plants of cold Latitudes, but a great number of annual vegetables, which grow during the courſe of a Summer, in warm and temperate Latitudes. I know, by experience, that the Summer's heat is as powerful at Peterſburg as under the Line.

There are, beſides, parts of the ground, in the North, which have configurations perfectly adapted to afford a ſhelter againſt the northerly winds, and to multiply the warmth of the Sun. If the South has its icy mountains, the North has its reverbatory valleys. I have ſeen one

of those small valleys, near Petersburg, at the bottom of which flows a brook that never freezes, even in the midst of Winter. The rocks of granite, wherewith Finland is roughened all over, and which, according to the report of Travellers, cover most of the lands of Sweden, of the shores of the Frozen Ocean, and all Spitzbergen, are sufficient for producing the same temperatures, in many places, and for diminishing in them, to a considerable degree, the severity of the cold.

I have seen, in Finland, near Wiburg, beyond the sixty first degree of Latitude, cherry trees entirely exposed to the weather, though these trees are natives of the forty second degree; that is, of the kingdom of Pontus, from whence *Lucullus* transplanted them to Rome, after the defeat of *Mithridates*. The peasantry of that Province cultivate tobacco with success, which is a much more southerly plant, being originally a native of Brasil. It is, I admit, an annual plant, and that it does not acquire, in its northern situation, a very high degree of perfume; for they are under the necessity of exposing it to the heat of their stoves, in order to bring it to a state of perfect maturity. But the rocks, with which Finland is covered over, would undoubtedly present, to attentive eyes, reverberating situations, which might bring it to a sufficient degree of maturity, without the aid of artificial heat.

I myself found, not far from the city of Fredericksham, upon a dunghill, under the shelter of a rock, a very lofty tuft of oats, the produce of a single seed, consisting of thirtyseven stalks, loaded with as many ears completely ripe, without reckoning a multitude of other small sucklers. I gathered it with an intention of having it presented to her Imperial majesty, *Catharine II*, by my General M. *Dubosquêt*, under whose orders, and in whose company I was then visiting the fortified places of that province: It was likewise his intention; but our Russian attendants, careless, as all slaves are, suffered it to be lost. He was exceedingly vexed at this, as well as I: I cannot

help thinking, that a sheaf of corn so rich and beautiful, the produce of a province, considered, even at Petersburg, as smitten with sterility, because of the rocks which cover its surface, and procured for it, from ancient Geographers, the epithet of *lapidosa*, (stony) would have been as acceptable to her Majesty, as the huge block of granite which she has since had conveyed from thence, to be formed, at Petersburg, into the basis of a statue of *Peter* the Great.

I have seen in Poland, several private individuals cultivate the vine and the apricot tree with very great success. Mr. *de la Roche*, Consul from the prince of Moldavia, carried me, when at Warsaw, to a little garden, in the suburbs of that City, which produced to the occupier an annual revenue of one hundred pistoles, though it did not contain quite thirty of the last mentioned tree. It was totally unknown in that country a hundred and fifty years ago. The apricot was first introduced into it by a Frenchman, valet de chambre to a Queen of Poland. This man raised the fruit secretly, and made presents of it to the Grandees of the Country, pretending that he had received it from France, by the couriers of the Court. The great people did not fail to pay him magnificently for his presents; and this species of commerce became to him the foundation of an ample fortune, by means of which his great grand children are at this day the most opulent Bankers of that Country.

What I have said respecting the possibility of enriching Russia and Poland with useful vegetables, is not only in the view of acknowledging, the best way in my power, the gracious reception with which I was honoured by persons of rank, and by the Government of those Countries when I was a stranger among them; but because these indications tend equally to the improvement of France, the Climate of which is more temperate. We have icy mountains, capable of producing all the vegetables of the North; and reverberating valleys equally adapted to the

production of most of those of the South. It would not be proper, as our custom is, to make an effort to render this species of culture general through a whole district, but to set it a going in some little sheltered exposure, or small winding valley. The influence of these positions is of no great extent. Thus, the famous Constantia vine of the Cape of Good Hope succeeds perfectly only on a small spot of ground, situated at the bottom of a little hill, whereas the adjoining and surrounding vineyards do not produce the muscadine grape of any thing like the same quality. Of this, too, I have my own personal experience.

In France, it would be proper to look for sheltered aspects, such as we have been describing, in places where there are white stones in abundance, the colour of which is the best adapted to reverberate the rays of the Sun. Nay, I believe, that marl is indebted to its white colour, for part of the heat which it communicates to the lands on which it is spread; for it reflects upon them the rays of the Sun with so much activity, as to burn up the first shoots of many herbs. This is the reason, if I am not mistaken, why marl, which has, in other respects, the principles of fecundation within itself, kills a great many of the smaller herbs, which are accustomed to grow under the shade of the corn, and whose first leaves are more tender than those of corn, which is, in general, the most hardy of gramineous plants.

It would be farther necessary to look for those fortunate exposures in the vicinity of the Sea, and under the influence of its winds, which are so necessary to the vegetation of many plants, that several of them refuse to grow in the inland parts of a country. Such is, among others, the olive tree, which it has been found impossible to propagate in the interior of Asia and of America, though the Latitude be, in other respects, favourable. Nay, I have remarked, that it is not fruitful in islands, and on shores where it is excluded from the sea breezes. To this cause

I ascribe the sterility of those which have been planted in the Isle of France, on its western shore; for it is sheltered from the East winds by a chain of mountains. As to the cocoa tree, it will not thrive, between the Tropics, unless it has, if I may venture to say so, its root in the sea water. It is, I firmly believe, for want of those geographical considerations, and some others of a similar nature, that many plans of improvement in cultivation have failed in France, and in her Colonies.

However that may be, it might be possible to find, within the kingdom, an icy mountain, with, perhaps, a reverberating valley below. It would be a most agreeable employment to go in search of such a situation, and the greatest benefits might be derived from it. We might convert it into a Royal Garden, which should present to our Sovereign a spectacle of the vegetation of a multitude of climates, upon one line, of less than fifteen hundred fathoms of elevation. There he might bid defiance to the burning heat of the dog star, under the shade of cedars, on the mossy bank of a rivulet issuing from the snow; and, perhaps, escape the severity of Winter's cold, at the bottom of a valley with a southern aspect, under the palm tree, and amidst a field of sugar canes. We might there naturalize the animals which are the compatriots of those vegetables. He might hear the braying of the rein deer of Lapland, from the same valley in which he would see the peacocks of Java building their nests. This landscape would collect around him a part of the tributes of the Creation, and exhibit to him an image of the terrestrial paradise, which was situated, as I suppose, in a similar position. In serious truth, I cannot help expressing a wish, that our Kings would extend their sublime enjoyments, as far as the study of Nature has pursued its researches under their flourishing Empire*.

* *Nescia mens hominum fati sortisque futuræ!* Ah, blind to futurity! Little did good Saint Pierre think, that the ill fated Prince, for whom he took so

It now remains, that I examine the harmonies which plants form with each other. These harmonies constitute the inexpressible charms lavished on the sites which Nature has sowed and planted with her own hand; and they are to be the subject of the ensuing section.

VEGETABLE HARMONIES OF PLANTS.

We are going to apply to plants the general principles laid down in the preceding Study, by examining, one after another, the harmonies of their colours, and of their forms.

The verdure of plants, which is so grateful to the eye, is a harmony of two colours opposite in their elementary generation, of yellow, which is the colour of the Earth, and of blue, which is the colour of the Heavens. Had Nature dyed plants yellow, they would have been confounded with the ground; if blue, they would have been confounded with the Heavens and the Waters. In the first case, all would have appeared earth; in the second, all would have appeared sea: But their verdure gives them contrasts the most delightful with the grounds of this magnificent picture, and consonances equally agreeable with the yellow colour of the earth, and with the azure of the Heavens.

The green colour possesses this farther advantage, that it accords in a most wonderful manner with all the others, which arises from its being the harmony of the two

much delight to plant and decorate this earthly Paradise, was, in the course of a few fleeting years, to be dethroned, imprisoned, condemned, and publicly executed, in the Metropolis of his own Kingdom; and the very name of King proscribed by a Nation once enthusiastically attached to Royalty. How wonderful are the Works of Nature! How mysterious the Ways of Providence!

H. H.

extreme colours. Painters, who are endowed with taste, hang the walls of their exhibition rooms with green, in order that the pictures, of whatever colours they may be, may detach themselves from that ground without harshness, and harmonize upon it without confusion.*

Nature, not satisfied with this first general tint, has employed, in extending it over the ground of her scene, what Painters call *transitions*. She has appropriated a particular shade of bluish green, which we call sea green, to plants which grow in the vicinity of water, and of the Heavens. This is the shade which, in general, tinges the plants of the shores, as reeds, willows, poplars; and those of high grounds, as the thistle, the cypress, and the pine; and which makes the azure of the rivers to harmonize with the verdure of the meadows, and the azure of the Heavens with the verdure of the heights. Thus, by means of this light and fugitive tint, Nature diffuses delicious harmonies over the limits of the waters, and along the profiles of landscapes; and it is productive of a still farther magic to the eye, in that it gives greater apparent depth to the valleys, and more elevation to the mountains.

Something more wonderful still challenges our attention, namely this, that though she employs but one single colour in arraying so many plants, she extracts out of it a quantity of tints so prodigious, that each of those plants has its own, peculiar to itself, and which detaches it sufficiently from its neighbour to be distinguishable from it; and each of these tints is varying, from day to day, from the commencement of Spring, when most of them exhibit

* Undoubtedly, when they put on a green ground, pictures of plants, or landscapes, such pictures detach themselves from it but indifferently. There is, in my opinion, a tint better adapted to be the ground of a picture gallery; namely, gray. This tint, formed of black and white, which are the extremes of the chain of colours, harmonizes with every other, without exception. Nature frequently employs it in the Heavens, and on the Horizon, by means of vapours and of clouds, which are generally of that colour.

themselves in a bloody verdure up to the last days of Autumn, when they are transformed into various yellows.

Nature, after having thus harmonized the ground of her picture, by means of a general colour, has detached from it every vegetable in particular, by means of contrasts. Such as are designed to grow immediately on the ground, on strands, or on dusky rocks, are entirely green, leaves and stems, as the greatest part of reeds, of grasses, of mosses, of tapers and of aloès; but those which are destined to arise out of the midst of herbage, have stems of different tints of brown; such are the trunks of most trees, and the stalks of shrubs. The alder, for example, which thrives amidst the grassy turf, has stems of an ash-coloured gray; but the wallwort, which entirely resembles it in all other respects, and which grows immediately on the ground, is green all over. The mugwort, which grows along hedges, has reddish stems, by which it is easily distinguishable from the neighbouring shrubs. Nay, there are, in every genus of plants, certain species which, by their shining colours, seem to have been formed for terminating the limits of their classes. Such is, in the forb genus, a species called the Canadian service tree, the branches of which are of a coral red. There are, in the willow tribe, osiers whose scions are as yellow as gold; but there is not a single plant which does not detach itself entirely from the ground which surrounds it by its flowers and by its fruits.

It is impossible to suppose that so many varieties should be mechanical results of the colour next to which bodies are placed; for example, that the bluish green of most mountain vegetables should be an effect of the azure of the Heavens. It is worthy of being remarked, that the blue colour is not to be found, at least as far as I know, in the flowers or in the fruits of lofty trees; for in this case, they would be confounded with the Heavens; but it is very common on the ground, in the flowers of herbs, such as the blue bottle, the scabious, the violet, the liverwort,

the iris, and many others. On the contrary, the colour of the earth is very common in the fruits of lofty trees, such as the chestnut, the walnut, the cocoa nut, and the cone of the pine. Hence we have an intimation, that the point of view of this magnificent picture was taken from the eye of Man.

Nature, after having distinguished the harmonic colour of each vegetable, by the contrasting colour of its flowers, and of its fruits, has followed the same laws in the forms which she has given them. The most beautiful of forms, as we have seen, is the spherical form ; and the most agreeable contrast which it is capable of forming, is when found in opposition to the radiating form. You will frequently find this form and its contrast in the aggregation of the flowers that go by the name of radiated, as the daisy, which has a circle of small, white, divergent petals, surrounding its yellow disk : We find it likewise, with other combinations, in the blue bottle, in the asters and a multitude of other species. When the radiating parts of the flower are outermost, the spherical parts are inmost, as in the species which I have just named ; but when the first are inmost, the spherical parts are outmost : This may be remarked in those whose stamina are drawn out into length, and the petals in spherical portions, such as the flowers of the hawthorn and of the apple tree, and most part of the rosaceous and liliaceous plants. Sometimes the contrast of the flower is with the surrounding parts of the plant. The rose is one of those in which it is most strongly marked : Its disk is formed of beautiful spherical portions, its calix is bristled with beards, and its stalk with thorns.

When the spherical form is found placed, in a flower, between the radiating and the parabolic, then there is a complete elementary generation, the effect of which is always highly agreeable ; it is this, too, which is produced by most of the flowers that have just been named, by the profile of their calices, which terminate their projecting

stems. The nosegay girls are so sensible of the value of this combination, that they sell a simple rose on its branch at a much higher price than they would ask for a large posy of the same flowers, especially if there are on it a few buds, which present the charming progressions of the florification. But Nature is so vast, and my incapacity so great, that I must restrict myself to throwing a simple glance on the contrast, which arises from the simple opposition of forms: It is so universal, that Nature has given it to plants which had it not in themselves, by opposing them to others which have a configuration entirely different.

The species opposite in forms are almost always in company. When you fall in with an old willow, on the bank of a river, which art has not degraded, you may frequently see upon it a great convolvulus covering the radiated foliage of the tree with its own heart formed leaves, and its bell shaped white flowers, to make up the defect of apparent flowers, which Nature has denied to this tree. Different species of ropeweed produce the same harmonies on various species of high gramineous plants.

These plants, called creeping, are scattered over the whole vegetable kingdom, and are appropriated, as I suppose, to each vertical species. They have a great variety of methods of fixing themselves on the upright plant, which would alone merit a particular treatise. There are some which turn themselves spirally around the trunks of forest trees, such as the honeysuckle; others, as pease, have hands with three to five fingers, by which they lay hold of shrubbery: It is very remarkable, that those hands do not make their appearance till they have acquired a height at which they begin to have occasion for them as a support; others, as the bastard pomegranate, attach themselves in form of cork screw; others form a simple hook with the tail of their leaf, as the nasturtium: The pink employs a similar method of adhesion. These two beautiful flowers are supported in our gardens with rods;

but it would be a problem well worthy of the investigation of Florists, to ascertain what are the auxiliary plants, if I may call them so, to which these were designed to unite themselves, in the places where they are native : Delightful groups might be formed by their reunion.

I am persuaded that there is not a vegetable but what has its opposite in some parts of the Earth : Their mutual harmony is the cause of the secret pleasure which we feel in wild rural scenes, where Nature is at liberty to combine them. The fir tree rises, in the forests of the North, like a lofty pyramid, of a dark green, and with a motionless attitude. The birch is almost always found in its vicinity, and grows to nearly the same height, is of the form of an inverted pyramid, of a lively verdure, with a moveable foliage, continually playing about with every breath of the wind. The round leaved trefoil loves to grow in the midst of the fine grass, and to adorn it with its own flowery nosegay. Nay, I believe that Nature has made those deep incisions in the leaves of a great many vegetables, entirely in the view of facilitating alliances of this sort, and of opening a passage for the grasses, the verdure and delicacy of whose stems form with them an infinity of contrasts. Of this instances innumerable may be seen in uncultivated fields, where tufts of grass pierce through the broad plants of the thistle and the echium. This arrangement has, likewise, been made, in order that the grasses, which are most useful of all vegetables, might receive a portion of the rain from Heaven, through the interstices of the broad foliage of those privileged children of Nature, which would stifle every thing around them, but for those profound incisions. Nature does nothing merely for the pleasure of doing it, but always connects with it some reason of utility : This appears to me the so much more decidedly marked, that the incisions in leaves are much more common, and deeper in the plants and under shrubbery, which rise to no great height, than in trees.

The harmonies resulting from contrast, are to be found even in the waters. The reed, on the brink of rivers, raises into the air its radiating leaves, and its embrowned distaff, whereas the *nymphaea* extends at its feet a broad heart formed foliage, and roses of yellow gold : The one presents, on the waters, a continued pallisade, and the other a platform of verdure.

Similar oppositions present themselves in the most frightful of climates. *Martens*, of Hamburg, who has given us a very good account of Spitzbergen, tells us, that when the seamen belonging to the vessel in which he navigated along its coasts, heaved up the anchor, they seldom failed to bring up with it a very broad leaf of the *alga marina*, six feet in length, and attached to a tail as long : This leaf was smooth, of a brown colour, spotted with black, striped with two white stripes, and made in form of a tongue : He calls it the plant of the rock. But what is very singular, it was usually accompanied by a hairy plant, about six feet in length, like a horse's tail, and formed of hairs so fine, that one might denominate it, says he, the silk of the rock. He found on those dismal shores, where the empire of *Flora* is in such a state of desolation, the *cochlearia* (scurvy grafs) and the sorrel, which grew together. The leaf of the first is rounded in form of a spoon, that of the other is lengthened into the shape of the iron head of an arrow. A Physician of considerable ability, of the name of *Bartholin*,* has observed, that the virtues of their salts are as opposite as their configurations ; those of the first are alkalies, those of the other are acids ; and from their union results what medical men call a neutral salt, which they ought rather to call a harmonic salt, the most powerful remedy which can be employed as an antiscorbutic, and the scurvy is a disease which is readily, and usually caught in those dreadful climates.

* See *Chamel's History of Common Plants*.

For my own part, I apprehend that the qualities of plants are harmonic as their forms ; and that as often as we find them grouped agreeably and constantly, there must result from the union of their qualities, for nourishment, for health, or for pleasure, a harmony as agreeable as that which arises from the contrast of their figures. This is a presumption that I could support, by referring to the instinct of animals, which, in browsing on the herbage, vary the choice of their aliments ; but this consideration would lead me away from my subject.

I should never come to a conclusion, were I to go into a detail respecting the harmonies of so many plants which we undervalue, because they are feeble or common. If we suppose them, for thought's sake, of the size of our trees, the majesty of the palm tree would disappear before the magnificence of their attitudes and of their proportions. Some of them, such as the echium, rise like superb candlesticks, forming a vacuum round their centre, and rearing toward Heaven their prickly arms, loaded, their whole length through, with lamps of violet coloured flowers. The verbascum, on the contrary, extends around it, its broad leaves of solemn drapery, and sends up from its centre a long distaff of yellow flowers, as salutary to the stomach, as grateful to the touch. The violet, of deep blue, contrasts, in the Spring, with the primrose, expanding its golden cup with a scarlet brim. On the embrowned angles of the rock, under the shade of ancient beech trees, the mushroom, white and round as an ivory piece for the chess board, arises out of a bed of moss of the most beautiful green.

Mushrooms alone present a multitude of unknown consonances and contrasts. This class is, first, the most varied of all those of the vegetables of our climates. *Sebastien le Vaillant* enumerates one hundred and four species of them in the vicinity of Paris, without taking into the account the fungoids, which furnish, at least, a dozen more. Nature has dispersed them over most shady places,

where they frequently form contrasts the most extraordinary. There are some which thrive only on the naked rock, where they present a forest of small filaments, each of which supports its particular chapter. There are some which grow on substances the most abject, with forms the most solemn ; such is that which thrives on what falls from the horse, and which resembles a Roman hat, whence it has borrowed its name. Others present agreeable consonances : Such is that which grows at the foot of the alder, under the form of a cockle. What nymph has planted a shell by the root of a tree of the rivers ?

This numerous tribe appears to have its destiny attached to that of the trees, which have each a mushroom appropriated to itself, and rarely to be found elsewhere ; Such are those which grow only on the roots of plumb trees and pines. To no purpose does Heaven pour down its copious rains ; the mushroom, under covert of its umbrella, receives not a single drop. They derive the whole support of life from the Earth, and from the potent vegetable to whose fortune they have united their own : Like those little Savoyards, who are planted as posts at the gates of the hotels of the Great, they extract their subsistence out of the superfluity of another ; they grow under the shade of the Powers of the forest, and live on the superabundance of their sumptuous banquets.

Other vegetables present oppositions of strength to weakness in a different way, and consonances of protection still more distinguished. Those which we have been mentioning, like lordly Chieftains, leave their humble friends at their feet : The others carry them in their arms, and place them upon their heads. They frequently receive the recompense of their noble hospitality. The liannes which, in the Antilles Islands, attach themselves to the trees of the forest, defend them from the fury of the hurricane. The Gallic Oak has oftener than once seen itself an object of veneration to the Nations, from having carried the mistletoe in its branches. The ivy, a friend to

monuments and tombs ; the ivy, with which, in ancient times, they crowned the Poets who conferred immortality, sometimes covers with its foliage the trunks of the stately trees. It is one, among many, of the irresistible proofs of the vegetable compensations of Nature ; for I do not recollect that I ever saw the ivy on the trunks of pines, of firs, or of other trees whose foliage lasts all the year round. It invests those only which are stripped by the hand of Winter. Symbol of a generous friendship, it attaches itself only to the wretched ; and when death itself has smitten its protector, it restores him again the honours of the forest where he lives no longer ; it makes him revive, by decorating his shade with garlands of flowers, and festoons of undecaying verdure.

The greatest part of plants which grow under the shade, are adorned with the most vivid colours ; thus the mosses display the brilliancy of their emerald green on the dusky sides of the rocks. In the forests, the mushroom and the agaricum distinguish themselves by their colours from the roots of the trees under which they grow. The ivy detaches itself from their gray barks by its shining green ; the mistletoe discloses its branches of a yellowish green, and its fruits similar to pearls, amidst the thick foliage of the oak. The aquatic convolvulus dazzles you with its large white bell shaped flowers on the trunk of the willow. The virgins' bower clothes with verdure the ancient towers, and, in Autumn, her foliage of gold and purple, seems to fix, on their sober eminences, the rich colours of the setting Sun. Other plants, entirely concealed from the eye, discover themselves by their perfumes. It is thus that the obscure violet invites the hand of lovers to the bosom of the prickly shrub. And thus is verified, on every hand, that great Law of contrasts, which governs the World : No aggregation is, in plants, the effect of chance.

Nature has established, in the numerous tribes of the vegetable kingdom, a multitude of alliances, the end of

which is unknown to us. There are plants, for example, the sexes of which are on different individuals, as in the animal Creation. There are others whom you always find united in several clusters, as if they loved to live in society; others, on the contrary, you almost always meet with in a state of solitude. I presume, that many of these relations are connected with the character of the birds which live on their fruits, and which sow them. The herbage in the meadows frequently represent the bearing of the trees in the forests; there are some which, in their foliage and proportions, resemble the pine, the fir, and the oak: Nay, I believe that every tree has a consonance in its corresponding herb. It is by a magic of this sort, that small spots of ground present to us the extent of a large district. If you are under a grove of oaks, and perceive, on an adjoining hillock, tufts of germander, the foliage of which resembles them in miniature, and you will feel all the effect of a perspective. These diminutions of proportion extend from trees even down to mosses, and are the causes, in part, of the pleasure which we enjoy in wild rural scenes, where Nature has had leisure to dispose and accomplish her plans. The effect of those vegetable illusions is so undoubtedly certain, that if you have the ground cleared, the extent of any particular spot, when stripped of its natural vegetables, appears much smaller than before.

Nature farther employs diminishing shades of verdure, which, being lighter on the summit of trees than at their base, gives them the appearance of being more lofty than they really are. She appropriates, besides, the pyramidal form to many mountain trees, in order to increase the apparent elevation of their site; this is observable in the larch, the fir, the cypress, and in many other plants, which grow on heights. She sometimes unites, in the same place, the effects of seasons and of climates the most opposite. She clothes, in hot climates, the whole sides of mountains with the vegetable called the ice plant, because

it seems entirely covered over with flakes of ice; you would believe that, in the midst of Summer, *Boreas* had breathed upon it all the chilling blasts of the North.

On the other hand, we find, in Russia, mosses in the midst of Winter; which, from the red and smoky colour of their flowers, have the appearance of being set on fire. In our rainy climates, she crowns the summits of hillocks with broom and rosemary; and the tops of ancient towers with the yellow gilliflower: In the midst of the gloomiest day, you would imagine you saw the rays of the Sun shining upon them.

In another place, she produces the effect of the wind in the midst of perfect stillness. In many parts of America, a bird has only to alight on a tuft of the sensitive plant, in order to put in motion the whole stripe, which sometimes extends to three furlongs. The European traveller stands still, and observes, with astonishment, the air tranquil, but the herbage in motion. I myself have sometimes mistaken, in our own woods, the murmur of poplars and of aspens, for the bubbling of brooks. Oftener than once, seated under their shade, on the skirt of a meadow, whose herbage the winds put into an undulatory motion, this multiplied tremulousness has transfused into my blood the imaginary coolness of the stream.

Nature frequently employs the ærial vapours, in order to give a greater extent to our landscapes. She diffuses them over the cavities of valleys, and stops them at the windings of rivers, giving you a glimpse, at intervals, of their long canals, illuminated by the Sun. She thus multiplies their plans, and prolongs their extent. She sometimes withdraws this magic veil from the bottom of the valleys, and rolling it over the adjacent mountains, on which she tinges it with vermilion and azure, she confounds the circumference of the Earth with the vault of Heaven. It is thus, that she employs clouds as evanescent as the illusions of human life, to raise us to Heaven; it is thus that she expands over her most profound

mysteries, the ineffable sensations of infinity, and that she withdraws from our senses the perception of her Works, in order to convey to our minds a more impressive feeling of them.

ANIMAL HARMONIES OF PLANTS.

Nature, after having established on a soil formed of fragments, insensible and lifeless, vegetables endowed with principles of life, of growth and generation, accommodated to these beings which had, together with these same faculties, the power of self motion, dispositions to inhabit them, passions to derive their nourishment from them, and an instinct which impels them to make a proper choice: These are animals. I shall here speak only of the most common relations which they have with plants; but were I to attempt a detail of those which their innumerable tribes have with the elements, with each other, and with Man, whatever might be my ignorance, I should disclose a multitude of scenes still more worthy of admiration.

In an order entirely new, Nature has not changed her Laws: She has established the same harmonies and the same contrasts, of animals to plants, as of plants to the elements. It would appear natural to our feeble reason, and consonant to the great principles of our Sciences, which ascribe so much power to analogies, and to physical causes, that so many sensible beings which are produced in the midst of verdure, should be, in process of time, affected by it. The impressions of their parents, added to those of their own infancy, which serve to explain so many appearances in the human species, acquiring, in them, increasing strength, from generation to generation, by new tints, ought, at length, to exhibit oxen and sheep as green as the grass on which they pasture. We

I have observed, in the preceding Study, that as vegetables were detached from the ground by means of their green colour, the animals which live on verdure distinguish themselves from it, in their turn, by means of their dusky colours; and those which live on the dusky barks of trees, or of other dark grounds, are invested with colours brilliant, and sometimes green.

On this subject, I have to remark, that many species of the birds of India, which live amidst the foliage of trees, as the greatest part of paroquets, many of the colibri, and even of turtles, are of the finest green; but independently of the white, blue and red marbled spots, which distinguish their different tribes, and render them perceptible at a distance upon the trees, the brilliant verdure of their plumage detaches them, to great advantage, from the solemn and imbrowned verdure of those southern forests. We have seen that Nature employs this as the general means of diminishing the reflexes of the heat; but, that she might not confound the objects of her picture, if she has darkened the ground of her scene, she has bestowed greater brilliancy on the dresses of the actors.

It would appear that Nature has appropriated the species of animals coloured, in the most agreeable manner, to the species of vegetables, whose flowers are the least vivid, as a compensation. There are much fewer brilliant flowers between the Tropics, than in the temperate Zones; and, as a compensation, the insects, the birds, and even the quadrupeds, such as several species of monkeys and lizards, are there arrayed in the most lively colours. When they rest on their proper vegetable, they form with them the most beautiful contrasts, and the most lovely harmonies. I have often stood still, in the Westindies, to contemplate the little lizards, which live on the branches of trees, employing themselves in catching flies. They are of a beautiful apple green, and have on their back a sort of characters of the most vivid red, resembling the letters of the Arabian alphabet. When a cocoa tree had

several of them dispersed along its stem, never was there Egyptian Pyramid of porphyry, with its hieroglyphics, so mysterious and so magnificent, in my eyes.*

I have, likewise, seen flocks of small birds, denominat-
ed *cardinals*, because they are red all over, settle on shrub-
bery, the verdure of which was blackened by the Sun, and
present the appearance of girandoles studded with little
burning lamps. Father *du Tertre* says, that there is not,
in the Antilles, a spectacle more brilliant, than the alight-
ing of coveys of the parrot species, called *arras*, on the
summit of a palm tree. The blue, the red and the yellow
of their plumage, covers the boughs of the flowerless tree,
with the most superb enamel. Harmonies somewhat sim-
ilar may be seen in our own climates. The goldfinch,
with his red head, and wings tipped with yellow, appears,
at a distance, on a bush, like the flower of the thistle in
which he was hatched. You would sometimes take the
slate coloured wagtail, when perched on the extremity of
the leaves of a reed, for the flower of the iris.

It would be a very great curiosity to collect a great
number of these oppositions, and of those analogies. They
would lead us to a discovery of the plant, which is pecu-
liarly adapted to each animal. Naturalists have paid to
those adaptations no great degree of attention; such of
them as have written the History of Birds, have classed
them according to the feet, the bill, the nostrils. They
sometimes speak of the seasons of their appearance, but
scarcely ever of the trees which they frequent. Those
only who, employed in making collections of butterflies,
are frequently under the necessity of looking for them in
their state of nymph, or caterpillar, have sometimes distin-
guished those insects by the names of the vegetables on

* They have sometimes served me to explain the moral sense of hiero-
glyphics, engraven on the obelisks of Egypt, in honour of her conquering
heroes. On beholding the characters traced upon them from right to left,
with heads, beaks and paws, they brought to my recollection the little fly
catchers of my palm trees.

which they found them. Such are the caterpillars of the tithymale, of the pine, of the elm, and so on, which they discovered to be peculiarly appropriated to these vegetables. But there is not an animal existing but what may be referred to its own particular corresponding plant.

We have divided plants into aërial, aquatic and terrestrial, as animals themselves are divisible, and we have found, in the two extreme classes, unvarying harmonies with their elements. They may be farther divided into two classes, into trees and herbs, as animals likewise are into volatile and quadrupeds. Nature does not associate the two kingdoms in consonances, but in contrasts; that is, she does not attach the great animals to the great vegetables; but unites them contrariwise, by associating the class of trees with that of the small animals, and that of herbs with the great quadrupeds: And by means of these oppositions, she bestows adaptations of protection to the feeble, and of accommodation to the powerful.

This Law is so general, that I have remarked, in every country, where there is no great variety in the species of grasses, those of the quadrupeds which live upon them are but few in number; and that wherever the species of trees are multiplied, those of volatile are likewise so. The truth of this may be ascertained by consulting the herbals of many parts of America, and, among others, those of Guyana and of Brasil, which present but few varieties in the grasses, but a great number in the trees. It is well known that those countries have, in fact, few quadrupeds natural to them, and that they are peopled, on the contrary, with an infinite variety of birds and insects.

If we cast a glance on the relations of grasses to quadrupeds, we shall find that, notwithstanding their apparent contrasts, there is actually between them a multitude of real correspondencies. The small elevation of the gramineous plants places them within the reach of the jaws of quadrupeds, whose head is in a horizontal position, and frequently inclined toward the ground. Their delicate

shoots seem formed to be laid hold of by broad and fleshy lips ; their tender stems, easily snapped by the incisive teeth ; their mealy seeds easily bruised by the grinders. Besides, their bushy tufts, and elastic without being ligneous, present soft litter to ponderous bodies.

If, on the contrary, we examine the correspondencies which exist between trees and birds, we shall find that the branches of trees may be easily clasped by the four toed feet of most birds, which Nature has disposed in such a manner, that by means of three before and one behind, they may be able to grasp the bough as with a hand. Again, the birds find, in the different tiers of the foliage, a shelter against the rain, the Sun, and the cold, toward which the thickness of the trunks farther contribute. The apertures formed in these, and the mosses which grow upon them, furnish situations for building their nests, and materials for lining them. The round or oblong seeds of trees are accommodated to the form of their bills. Such as bear fleshy fruits are resorted to by birds, which have beaks pointed, or crooked, like a pick axe.

In the islands of the regions situated between the Tropics, and along the banks of the great rivers of America, the greatest part of maritime and fluvial trees, among others, many species of the palm tree, bear fruits enclosed in very hard shells, whereby they are enabled to float on the face of the waters, which resow them at a great distance ; but their covering does not secure them from the attack of the birds. The different tribes of paroquets which have made them their habitation, and of which I have reason to believe that there is a species appropriated to each species of palm tree, easily find means to open their hard cases with hooked bills, which pierce like an awl, and hold fast like pincers.

Nature has, farther, accommodated animals of a third order, which find in the bark, or in the flower of a plant, as many conveniencies as the quadruped has in a meadow, or the bird in the whole tree : I mean the insects.

Certain naturalists have divided them into six great tribes, which they have characterized, according to custom, but to very little purpose, by Greek names. They class them into *coléopterous*, or cased, insects; as the scarab tribe, such are our maybugs, or chafers: Into *hémipterous*, or half cased, as the gallinsects, such is the kermés: Into *tétrapterous farinaceous*, or four mealy winged, as butterflies; into *tétrapterous*, without any addition, or four naked winged, as bees; into *dipterous*, or two winged, as the common fly; and into *apterous*, or wingless, as the ant. But these six classes admit of a multitude of divisions and of subdivisions, which unite species of insects, of forms and instincts the most dissimilar; and separate a great many others of them which have otherwise a very striking analogy among themselves.

Whatever may be in this, the order of animals in question appears to be particularly attributed to trees. *Pliny* observes that ants are singularly fond of the grains of the cypress. He tells us, that they attack the cones which contain them, on their half opening as they arrive at maturity, and plunder them to their very last seed; and he considers it as a miracle of Nature, that an insect so diminutive should destroy the seed of one of the largest trees in the World. I believe we never shall be able to establish, in the different tribes of insects, a real order, and in the study of them, that pleasure and utility of which it is susceptible, but by referring them to the different parts of vegetables. Thus we might refer to the nectars of the flowers, the butterflies and flies which are furnished with a proboscis for sipping up their juices; to their stamina, those flies which, like the bee, have spoon mouths scooped out in their thighs, lined with hair, for collecting their powder, and four wings to assist them in carrying off their booty; to the leaves of plants, the common flies and the gallinsects, which have pointed and hollow prongs for making incisions in them, and for drinking up their fluids; to the grains, the scarab race, as the weevil, which

is designed to force its way into the heart of the seed to feed upon its meal, and which is provided with wings, inclosed in cases, to prevent their being injured, and with a file to open for itself a passage; to the stem, those worms which are quite naked, because they have no need of being clothed in a substance of wood, which shelters them on every side, but they are furnished with augers, by the help of which they sometimes go nigh to destroy whole forests; finally, to the wreck of every sort, the ants which come armed with pincers, and with an instinct of advancing in bands to cut to pieces, and to carry off every thing that suits their purpose.

The desert of this vast vegetable banquet is hurled down by the rainy torrents to the rivers, and thence to the Sea, where it presents a new order of relation with the fishes. It is worthy of remark, that the most attractive baits which can be presented to them, are deduced from the vegetable kingdom, and particularly from the grains, or from the substances of the plants, which have the aquatic characters which we have indicated, such as the hard shell of the Levant, the rush of Smyrna, the juice of the tithymal, the Celtic spikenard, the cummin, the anise, the nettle, the sweet marjoram, the root of the birthwort, and the seed of the hemp. Thus, the relations of these plants with fishes confirm what has been said of those of their grains with the waters.

By referring the different tribes of insects to the different parts of plants, and in that way only, can we discern the reasons for which Nature has been determined to bestow on those diminutive animals figures so extraordinary. We should then know the uses of their utensils, of which the greater part is hitherto unknown; and we should have continually new occasion to admire the Divine Intelligence, and to perfect our own. On the other hand, such progress in knowledge would diffuse the clearest light over many parts of plants, the utility of which is a world

unknown to Botanists, because they have consonances only with animals.

I am persuaded, that there is not a single vegetable but what has connected with it, at least, one individual of each of the six general classes of insects, acknowledged by Naturalists. As Nature has divided each genus of plants into different species, in order to render them capable of growing in different situations; she has, in like manner, divided each genus of insects into different species, in order to adapt them to inhabit different species of plants. For this reason she has painted, and numbered, in a thousand different, but invariable ways, the almost infinite divisions of the same branch. For example, we constantly find on the elm the beautiful butterfly, called the gold brocade, on account of its rich colouring. That which goes by the name of the four omicrons, and which lives I know not where, always produces descendants impressed with that Greek character, four times, on their wings. There is a species of bee with five claws, which lives on radiated flowers only; without those claws, she could not cling fast to the plane mirrors of those flowers, and load herself from their stamina, so easily as the common bee, which usually labours at the bottom of those which have a deep corolla.

Not that I imagine any one plant nourished, in its different varieties, all the collateral branches of one family of insects. I believe that each genus of these extends much farther than the genus of plants which serves as its principal basis. In this, Nature manifests another of her Laws, by virtue of which she has rendered that the best which is the most common. As the animal is of a nature superior to the vegetable, the species of the first are more multiplied, and more generally diffused than those of the second. For example, there are not so many as sixteen hundred species of plants in the vicinity of Paris; but within the same compass there are enumerated near six thousand species of flies. This leads me to presume,

therefore, that the different tribes of plants cross with those of animals, which renders their species susceptible of different harmonies. Of this a judgment may be formed from the variety of tastes, in birds of the same family. The black headed yellow hammer nestles in the ivy; the red headed in walls, in the neighbourhood of hemp fields; the brown yellow hammer builds on trees by the highway's side, where she finishes off her nest with horse hair. A dozen species of that bird are enumerated in our climates, each of which has its particular department. Our different sorts of larks are likewise apportioned to different situations; to the woods, to the meadows, to the heaths, to arable lands, and to the shores of the Sea.

Very interesting observations may be made respecting the duration of vegetables, which are unequal, though subjugated to the influences of the same elements. The oak serves as a monument to the nations: and the *nostrum*, which grows at his foot, lives only a single day. All I shall say upon this head, in general, is, that the period of their decay is by no means regulated in conformity to that of their growth; neither is that of their fecundity proportioned to their weakness, to climates, or to seasons, as some have pretended. *Pliny** quotes instances of holmes, of plane trees, and of cypresses, which existed in his time, and which were more ancient than Rome, that is, more than seven hundred years old. He farther tells us, that there were still to be seen near Troy, around the tomb of Ilus, oaks which had been there from the time that Troy took the name of Ilium, which carries us back to an antiquity much more remote.

I have seen, in Lower Normandy, in a village church yard, an aged yew, planted in the time of *William* the Conqueror; it is still crowned with verdure, though its trunk cavernous, and through and through pervious to the day, resembles the staves of an old cask. Nay, there

* Natural History, book xvi. chap. 44.

are bushes which seem to have immortality conferred upon them. We find, in many parts of the kingdom, hawthorns, which the devotion of the Commonalty has consecrated by images of the Virgin, and which have lasted for several ages, as may be ascertained by the inscriptions upon the chapels which have been reared in the vicinity.

But, in general, Nature has proportioned the duration and the fecundity of plants to the demands of animal life. A great many plants expire as soon as they have yielded their seed, which they commit to the winds. There are some, such as mushrooms, whose existence is limited to a few days, as the species of flies which feed upon them. Others retain their seeds all the Winter through, for the use of the birds; such are the fruits of most shrubs.

The fecundity of plants is by no means regulated according to their size; but proportionally to the fecundity of the animal species which is to feed upon them. The pannic, and the small millet, and some other gramineous plants, so useful to man and beast, produce incomparably more grains than many plants, both greater and smaller than themselves. There are many herbs which perpetuate themselves, by their seeds, only once a year; but the chickweed renovates itself by its seeds, up to seven or eight times, without being interrupted in the process even by Winter. It produces ripe seeds within six weeks from the time of its being sown. The capsule, which contains them, then inverts itself, turning toward the earth and half opens, to leave them at liberty to be carried away by the winds, and the rains, which sow them again every where. This plant ensures, the whole year through, the subsistence of the small birds of our climates. Thus, Providence is so much the more powerful, as the creature is more feeble.

Other plants have relations to animals the more tenderly affecting, in proportion as climates and seasons seem to exercise over the animal the greater degree of severity. Were we enabled to investigate these adaptations to the

bottom, they would explain all the varieties of vegetation, in every latitude, and in every season. Wherefore, for example, do most of the trees of the North shed their leaves in Winter; and wherefore do those of the South retain theirs all the year round? Wherefore, in defiance of the Winter's cold in the North, do the firs there continue always clothed with verdure? It is a matter of no small difficulty to discover the cause of this; but the end is obviously discernible. If the birch and the larch of the North drop their foliage, on the approach of Winter, it is to furnish litter to the beasts of the forest; and if the pyramidical fir there retains its leaves, it is to afford them shelter amidst the snows. This tree then presents to the birds the mosses which are suspended on its branches, and its cones replenished with ripe kernels. In their vicinity, oft times, thickets of the service tree display for their use the shining clusters of their scarlet berries.

In the Winters of our climates, many evergreen shrubs, as the ivy, the privet and others, which remain loaded with black or red fruit, contrasting strikingly with the snow, as the prime print, the thorn and the eglantine, present to the winged creation both a habitation and food. In the countries of the Torrid Zone, the earth is clothed with fresh liannes, and shaded with trees of a broad foliage, under which animals find a cool retreat. The trees themselves, of those climates, seem afraid of exposing their fruits to the burning heat of the Sun: Instead of rearing them as a cone, or exhibiting them on the circumference of their heads, they frequently conceal them under a thick foliage, and bear them attached to their trunks, or at the sprouting of their branches: Such are the *jacquier*, the banana, the palm tree of every species, the *papayer*, and a multitude of others. If their fruits invite not the animals externally, by vivid colours, they call them by the noise which they excite. The lumpish cocoanut, as it falls from the height of the tree which bears it, makes the earth resound to a considerable distance. The black pods of

the *cannecier*, when ripe, and agitated by the wind, produce, as they clash against each other, a sound resembling the tic tac of a mill. When the grayish fruit of the genipa of the Antilles comes to maturity, and falls from the tree, it bounces on the ground with a noise like the report of a pistol.* Upon this signal, more than one guest, no doubt, resorts thither in quest of a repast. This fruit seems particularly destined to the use of the land crabs, which are eagerly fond of it, and very soon grow fat on this kind of food. It would have answered no purpose to them to see it on the tree, which they are incapable of climbing; but they are informed of the moment when it is proper for food, by the noise of its fall.

Other fruits, as the jaque and mango, affect the sense of smelling in animals so powerfully, as to be perceptible more than the quarter of a league distant, when the fruit is to windward. I believe that this property, of emitting a powerful perfume, is likewise common to such of our fruits as lie concealed under the foliage, apricots, for instance. There are other vegetables which manifest themselves to animals, if I may use that expression, only in the night time. The jalap of Peru, or the belle of the night, opens not her strongly scented flowers except in the dark. The flower of the nasturtium, or nun, which is a native of the same country, emits, in the dark, a phosphoric light, observed, for the first time, in Europe, by a daughter of the celebrated *Linnaeus*.

The properties of these plants convey a happy idea of those delightful climates, in which the nights are sufficiently calm, and sufficiently luminous to disclose a new order of society among animals. Nay, there are insects which stand in no need of any pharos to assist them in steering their nocturnal courses. They carry their lanterns about them; such are the species of luminous flies. They scatter themselves, sometimes, in the groves of or-

* Father *du Tertre's* History of the Antilles.

ange trees, of papayas, and other fruit trees, in the midst of the darkest night. They dart, at once, by several reiterated beatings of their wings, a dozen of fiery streams, which illuminate the foliage and fruits of the trees whereon they settle, with a golden and bluish light;* then, all at once repressing their motion, they plunge again into obscurity. They alternately resume and intermit this sport during the whole night. Sometimes there are detached from them swarms of brilliant sparks of light, which rise into the air, like the emanations of a firework.

Were we to study the relations which plants have to animals, we should perceive in them the use of many of the parts, which are frequently considered as productions of the caprice, and of the confusion, of Nature. So widely extended are those relations, that it may be confidently affirmed, that there is not a down upon a plant, not an intertexture of a shrub, not a cavity, not a colour of leaf, not a prickle, but what has its utility. Those wonderful harmonies are especially to be remarked, with relation to the lodgings and the nests of animals. If, in hot countries, there are plants loaded with down, it is because there are moths, entirely naked, which clip off their fleece, and weave it into clothing. There is found, on the banks of the Amazon, a species of reed, from twentyfive to thirty feet high, the summit of which is terminated by a large ball of earth. This ball is the workmanship of the ants, which retire thither at the time of the rains, and of the periodical inundations of that river: They go up, and descend along the cavity of this reed, and live on the refuse which is then swimming around them on the surface of the water.

It is, I presume, for the purpose of furnishing similar retreats to many small insects, that Nature has hollowed the stems of most of our plants of the shore. The valif-

* Consult the same Work of *du Tertre*.

neria,* which grows in the stream of the Rhone, and carries its flower on a spiral stem, capable of being drawn out in proportion to the rapidity of the sudden swellings of that river, has holes pierced through at the basis of its leaves, the use of which is much more extraordinary. If you take up this plant by the root, and put it into a large vessel full of water, you perceive, at the basis of its leaves, masses of a bluish jelly, which insensibly lengthen into pyramids of a beautiful red. These pyramids presently furrow themselves into flutings, which disengage from the summit, invert themselves all around, and present, by their expansion, very beautiful flowers formed of rays purple, yellow and blue. By little and little, each of these flowers advances out of the cavity in which it is partly contained, and withdraws to some distance from the plant, remaining, however, attached to it, by a small filament. You then perceive each of the rays of which those flowers are composed, assume a motion peculiar to itself, which communicates a circular movement to the water, and precipitates to the centre of each of them all the small bodies which are floating around. If those wonderful expansions are disturbed by any sudden shock, immediately every filament contracts, all the rays close, and all the pyramids retire into their cavities; for those pretended flowers are polypuses.

There are, in certain plants, parts which may be considered as characters of uncultivated Nature, but which are like all the rest of her Works, evident proofs of the wisdom and providence of her AUTHOR; such are the prickles. Their forms are varied without end, especially

* Consult, with regard to the *Valisneria*, the Voyage of an anonymous English traveller, performed in the year 1750, to France, Italy, and the Islands of the Archipelago, in four small volumes, vol. i. It is stored with judicious observations of every kind. Consult likewise, respecting the *genipa*, and the different fruits, plants, and animals of southern countries, the sprightly *Father du Tertre*, the patriotic *Father Charlevoix*, *John de Laet*, the Historian, and all travellers who have written on the subject of Nature, without the spirit of system, assisted by the light of reason alone.

in hot countries. Some are shaped like saws, like hooks, like needles, like the head of a halberd, and like caltrops, some of them are round like awls, some triangular, like the shoemaker's piercer, and some flattened like a lancet. There is no less variety in their aggregations. Some are arranged on the leaves in balls, like those of the opuntia; others in stripes, like those of the Peruvian taper. Some are invisible, as those of the shrub of the Antilles, known by the name of captain's wood. The leaves of this formidable plant, appear, on the upper side, smooth and shining; but they are covered, on the under side, with very delicate prickles, which are inserted in such a manner, that, apply your hand to them ever so cautiously, it is impossible to avoid pricking your fingers.

There are other thorns planted only on the stems of plants, others are on their branches. In our climates, they are scarcely ever to be found, except on shrubbery, and on a few trees; but in both Indies, they are scattered over a great many species of trees. Their very various forms and dispositions have relations, of which the greatest part are to us unknown, to the security and defence of the birds which live upon them. It was necessary that many of the trees of those countries should be armed with thorns, because many quadrupeds are there to be found, capable of climbing them, to eat the eggs and the young of birds, such as the monkey, the civet cat, the tyger, the wild cat, the musk rat, the opossum, the wild rat and even the common rat.

The Asiatic acacia* presents to its winged inhabitants a retreat absolutely inaccessible to their enemies. It bears

* There is a plant of the Asiatic acacia to be seen in that beautiful garden adjacent to the iron gate of Chaillot, which formerly belonged to the virtuous Chevalier de Genfin. As to the name of *false acacia*, given to the acacia of America, I must observe, that Nature produces nothing false. She has given varieties of all her productions, in all Countries, in order to bestow upon them relations adapted to the elements and to animals; and when we do not find in these the characters which we have assigned to them, the charge of falshood is not, in justice, to be fixed on her Works, but on our systems.

no prickles on its trunk, and in its branches ; but at the height of ten or twelve feet, precisely at the place where the tree begins to branch off, there is a belt of several rows of large thorns, from ten to twelve inches in length, presenting an impenetrable rampart of spikes, nearly resembling the iron head of a halberd. The collar of the tree is encircled by it in such a manner, that it is impossible for any quadruped to get up. The acacia of America, improperly called the false acacia, has its prickles formed into hooks, and scattered over its branches, undoubtedly from some unknown relation of opposition to the species of quadruped which makes war on the bird that inhabits it.

There are, in the Antilles Islands, trees which have no thorny prickles, but which are much more ingeniously protected than if they had. A plant known in those countries by the name of the prickly thistle, which is a species of creeping taper, attaches its roots, similar to filaments, to the trunk of one of those trees, and runs to the ground all around it, to a considerable distance, crossing its branches one over another, and forming an inclosure of them, which no quadruped dares to approach. It likewise produces a fruit very grateful to the palate. On beholding a tree, the foliage of which is harmless, filled with birds that have there fixed their habitation, surrounded about the roots by one of those prickly thistles, and you are presented with the idea of one of those commercial defenceless cities, apparently accessible on every side, but protected all around by a citadel, encompassing it with extended intrenchments. Thus the tree is on one side, and its thorn on the other.

Quadrupeds, which live on the eggs of birds, would be reduced to great distress, did not Nature sometimes produce, on the summits of those very trees, a vegetable of very extraordinary form, which opens a passage to them. It is, in every respect, the opposite of the prickly thistle. It is a root of two feet in length, as thick as a man's leg,

pricked, as if pierced with a bodkin, and adhering to a branch of the tree, by a multitude of filaments, somewhat in the same way that the prickly thistle is affixed to the under part of its trunk. Like the other, it derives its nourishment from the tree, and emits from ten to twelve great leaves, in form of a heart, of about three feet in length, and two feet in breadth, resembling the leaves of the nymphæa. Father *du Tertre* calls it the false root of China. What is still more extraordinary, it lets fall, from the top of the tree on which it is placed, in a perpendicular direction, very strong cordage, of the size of a quill, the whole length through, which takes root on reaching the ground. The plant itself emits no smell, but this cordage smells strongly of garlic. Undoubtedly, when a monkey, or some such clambering animal, perceives this broad standard of verdure, to no purpose does the tree oppose, around its root, a fortification of thorns, this signal announces that he has a friend within the fortrefs: The smell of the cordage, which descends down to the ground, directs him to the scaling ladder, even during the night; and while the birds are sleeping in security on their nests, confident in the strength of their bulwarks, the enemy gets possession of the town through the suburbs.

In those countries, the thorns upon the trees afford protection even to the insects. Bees there carry on their honey making processes in the aged trunks of prickly trees, hollowed by the hand of Time. It is very remarkable that Nature, who has provided this resource for the bees of America, has withheld from them a sting, as if those on the trees were sufficient for their defence. I believe that to this reason it may be ascribed, though no attention has been paid to it, that we have never hitherto been able to rear in the Antilles Islands, the honey bees of the country. They refused, no doubt, to take up their abode in domestic hives, because they did not consider themselves as there in a state of security; but might, per-

haps, have been induced to make that choice, had the hives, to which they were invited, been decorated and defended by thorns.

If Nature employs prickly vegetables for the defence even of flies against the attacks of quadrupeds, she sometimes makes use of the same means for delivering quadrupeds from the persecution of common flies. She has, in truth, bestowed on those which are the most exposed to it, manes and tails, armed with long hair, to drive them away; but the multiplication of those insects is so rapid in warm and humid seasons and countries, as to threaten destruction to the whole race of animals. One of the vegetable barriers, opposed to them by Nature, is the *dionæa muscipula*. This plant bears on one and the same branch, opposite little leaves, besmeared with a sugary liquor, resembling manna, and studded with very sharp prickles. When a fly perches on one of those little leaves, they instantly close with a spring, like the jaws of a wolf trap, and the fly is spitted through and through.

There is another species of the *dionæa* which catches those insects with its flower. When the fly attempts to extract its nectareous juices, the corolla, which is tubulous, shuts at the collar, seizes the insect by the proboscis, and thus puts it to death. This plant is cultivated in the Royal Garden. It is observable, that its cup formed flower is white, radiated with red, and that these two colours universally attract flies, from their natural avidity of milk and of blood.

There are aquatic plants, armed with thorns, proper for catching fishes. You may see in the Royal Garden, an American plant, called *martinia*, the flower of which has a very agreeable odour, and which, from the form of its rounded leaves, the sleekness of their tails and of their stems, has all the aquatic characters which have been indicated. It has this farther character peculiar to itself, that it transpires so copiously as to appear to the touch in a state of continual humidity. I can have no doubt, there-

fore, that this plant grows in America on the brink of the water. But the shell which envelops its seeds possesses a very extraordinary nautical character. It resembles a fish half dried, white and black, with a long fin upon the back. The tail of this fish is drawn out into great length, and terminates in a very sharp point, bent into the form of a fish hook. This tail usually separates into two, and thus presents a double hook. The configuration of this vegetable fish is completely similar in size, and in form, to the hook which is employed at sea for catching goldneys, and at the head of which is figured, in linen, a flying fish, with this exception, that the goldney hook has but one curve and barb, whereas the shell of the martinia has two, which must render its effect more infallible. This shell contains several black seeds, shrivelled, and similar to the globules of the sheep's dung flattened.

As I possess but few books on Botany, I did not know of what country the martinia was a native; but having lately consulted the Work of *Linnaeus*, I find that we got it from Vera Cruz. The celebrated Naturalist, whom I have just mentioned, discovers, in this shell, no resemblance but that of a woodcock's head; but had he ever seen the hook for goldneys, he could not possibly have hesitated about preferring this similitude, in the appearance, in as much as the extremity of this pretended beak bends back into two hooks, which prick like needles, and are, as well as the whole shell, and the tail, by which it is united to the stem, of a ligneous and horny substance, not easily broken asunder. *John de Laet* * tells us, that the land of Vera Cruz is on a level with the Sea, and that its port, called *St. John de Hulloo*, is formed by a small island, no higher than the water; so that, says he, when the tide rises very high, the land wholly disappears.

Such inundations are very common at the bottom of the Gulf of Mexico, as we learn from the relation which *Dam-*

* History of the Westindies, book v. chap. 18.

pier has given us of the Bay of Campechy, which is in that vicinity. Hence I presume, that the martinia, which grows on the inundated shores of Vera Cruz, has certain relations, which we know nothing of, to the fishes of the Sea ; in as much as the seeds of several trees and plants of those countries, described by *John de Laet*, possess very curious nautical forms. A drawing of the martinia, taken from Nature, is presented fronting page 221 of this Volume.

But there is no occasion to resort to foreign plants, for ascertaining the existence of vegetable relations to animal. The bramble, which affords, in every field through which we pass, a shelter to so many birds, has its prickles formed into hooks ; so that it not only prevents the cattle from disturbing the birds' retirement, but frequently lays them under contribution for a flake of wool or hair, proper for finishing off their nests, as a reprisal for hostility committed, and an indemnification for damages sustained. *Pliny* alleges, that this gave rise to the pretended animosity between the linnet and the ass. This quadruped, whose palate is proof against thorns, frequently browses on the shrub in which the linnet builds her nest. She is so terrified at his voice, that on hearing it, says he, she kicks down her eggs ; and her callow brood die with terror of it. But she makes war upon him, in her turn, by fixing her attack on the scratches made in his hide by the prickles, and picking the flesh in those tender parts, to the very bone. It must be a very amusing spectacle to view the combat between the little and melodious songster, and the dull, braying, but otherwise inoffensive, animal.

Did we know the animal relations of plants, we should possess sources of intelligence respecting the instincts of the brute creation, with which we are totally unacquainted. We should know the origin of their friendships, and of their animosities, at least as to those which are formed in society ; for with regard to such as are innate, I do not believe that the cause of them was ever revealed to any

man. These are of a different order, and belong to another world. How should so many animals have entered into life, under the dominion of hatred, without having been offended; furnished with skill and industry, without having served an apprenticeship; and directed by an instinct more infallible than experience? How came the electrical power to be conferred on the torpedo, invisibility on the cameleon, and the light of the stars themselves on a fly? Who taught the aquatic bug to slide along the waters, and another species of the same denomination to swim upon the back; both the one and the other for catching their prey, which hovers along the surface? The water spider is still more ingenious. She encloses a bubble of air in a contexture of filaments, takes her station in the middle, and plunges to the bottom of the brook, where the air bubble appears like a globule of quicksilver. There, she expatiates under the shade of the nymphæa, exempted from the dread of every foe. If, in this species, two individuals, different in sex, happen to meet, and to suit each other, the two globules, being in a state of approximation, become united into one, and the two insects are in the same atmosphere. The Romans, who constructed on the shores of Baixæ, saloons underneath the waves of the Sea, in order to enjoy the coolness, and the murmuring noise of the waters, during the heats of Summer, were less dexterous, and less voluptuous. If a man united in himself those marvellous faculties which are the portion of insects, he would pass for a god with his fellow creatures.

It is of importance for us to be acquainted with, at least, such insects as destroy those which are offensive to Man. We might turn their mutual hostility to good account, by converting it into the means of our own repose. The spider catches the flies in nets; the formicaleo surprises the ants in a tunnel of sand; the four-winged ichneumon seizes the butterflies on the wing. There is another ichneumon, so small and so cunning, that it lays an egg in the

anus of the vine fretter. Man has it in his power to multiply at pleasure the families of insects which are useful to him ; and may find means of diminishing such as make depredations on his agricultural possessions. The small birds of our groves tender him, to the same effect, services of still greater extent, and accompanied with other circumstances inexpressibly agreeable. They are all directed by instinct to live in his vicinity, and about the pastures and habitations of his flocks and herds. A single species of them might frequently be sufficient to protect the cattle from the insects which infest them through the Summer.

There is in the North a gadfly, called *Kourbma* by the Laplanders, and by the Learned, *ostrus rangiferinus*, which torments the domestic reindeer to such a degree as to force them in agony to the mountains, and sometimes actually plague them to death, by depositing their eggs in the skin of the animal. Many dissertations have, as the custom is, been composed on this subject, but no remedy for the evil has been proposed. I am convinced there must be birds in Lapland, which would deliver the reindeer from this formidable insect, did not the Laplanders terrify them away by the noise of their fowling pieces. These arms of civilized Nations have overspread with barbarism all our plains. The birds, destined to embellish the habitation of Man, withdraw from it, or approach with timidity and mistrust. The sound of musketry ought to be prohibited, at least, around the haunts of the harmless cattle. When the birds are not scared away by the fowler, they follow their instincts.

I have frequently seen in the Isle of France, a species of starling, called martin, imported thither from India, perch familiarly on the back and horns of the oxen, to pick them clean. To this bird that island stands indebted, at the present day, for the destruction of the locusts, which, in former times, committed such ravages upon it. In those of our European rural scenes which still exhibit,

on the part of Man, some degree of hospitality toward the innocent warblers, he has the pleasure of seeing the stork build her nest on the ridge of his house; the swallow flutter about in his apartments: And the wagtail, along the bank of the river, frisk around his sheep, to protect them from the gnats.

The foundation of all this variety of pleasant and useful knowledge is laid in the study of plants. Each of them is the focus of the life of animals, the species of which there collect in a point, as the rays of a circle at their centre.

As soon as the Sun, arrived in his annual progression, at the sign of the Ram, has given the signal of Spring to our Hemisphere, the rainy and warm wind of the South takes its departure from Africa, swells the Seas, elevates the rivers above their banks, so that they inundate the adjacent plains, and fatten them with their fertilizing slime; and levels, in the forests, the aged trees, the decayed trunks, and every thing that presents an obstacle to future vegetation. It melts the snows which cover our fields, and forcing its way to the very Pole, it breaks to pieces, and dissolves the enormous masses of ice which Winter had there accumulated. When this revolution, known all over the Globe by the name of the equinoctial gale, has taken place, in the month of March, the Sun revolves night and day around our Pole, so that there is not a single point, in the whole northern Hemisphere, that can escape his heat.

Every step he advances in his course through the Heavens, a new plant makes its appearance on the Earth. Each of them arises in succession, and occupies its proper station at the hour assigned to it; at one and the same instant it receives the light in its flowers, and the dew of Heaven on its foliage. In proportion to its progress in growth, the different insect tribes which thence derive their nourishment, likewise display their existence, and unfold their characters. At this epocha, too, each species of bird re-

forts to the species of plant with which she is acquainted, there to build her nest, and to feed her young with the animal prey which it presents to her, to supply the want of the seeds which it has not as yet produced. We presently behold the tribes of birds of passage flock thither, in quest of the portion which Nature has provided for them likewise. First comes the swallow, to preserve our habitations from the vermin, by planting her nest around us. The quail forsakes Africa, and grazing the billows of the Mediterranean, and in troops innumerable, is scattered over the boundless meadows of the Ukraine. The heathcock pursues his course northward as far as Lapland. The wild ducks and geese, the silvery swans, forming long triangular squadrons in the air, advance to the very islands adjacent to the Pole. The stork, in former times adored in Egypt, which she abandons, crosses over Europe, halting here and there to take repose, even in great cities, on the roofs of the houses of hospitable Germany. All these birds feed their young on the insects and reptiles which the newly expanded plants have fostered into life.

Then, too, it is that the fishes issue in legions, from the northern abysses of the Ocean, allured to the mouths of rivers by clouds of insects, which are confined entirely to their waters, or expand into life along their banks. They stem the watery current in shoals, and advance, skipping and springing, up to the very sources of the stream; others, as the northcapers, suffer themselves to be swept into the general current of the Atlantic Ocean, and appear, in form of a ship's bottom, on the coasts of Brasil, and on those of Guinea.

Quadrupeds themselves, likewise, then undertake long peregrinations. Some proceed from the South to the North, with the Sun; others from East to West. There are some which coast along the rugged chains of mountains; others follow the courses of rivers which have never been navigated. Lengthened columns of black cat-

the pasture, in America, along the banks of the Méchassipi,* which they cause to resound with their bellowing. Numerous squadrons of horses traverse the rivers and the deserts of Tartary; and wild sheep stray bleating amidst its vast solitudes. These flocks have neither overseer nor shepherd to guide them through the desert, to the music of the pipe; but the expansion of herbage which they know, determines the moment of their departure, and the limits of their progress. It is then that each animal inhabits his natural situation, and reposes under the shade of the vegetable of his fathers. It is then that the chains of harmony exert all their force, and that all, being animated by consonances, or by contrasts, the air, the waters, the forests, and the rocks, seem to be vocal, to be impassioned, to be transported with delight.

But this vast concert can be comprehended by celestial Intelligences only. To Man it is sufficient, in order to study Nature with advantage, that he limit his researches to the study of one single vegetable. It would be necessary, for this purpose, to make choice of an aged tree, in some solitary situation. From the characters which have been indicated, a judgment might easily be formed, whether it be in its natural position; but still better from its beauty, and from the accessories which Nature uniformly places in connexion with it, where the hand of Man has not interposed to derange the operations. The student would first observe its elementary relations, and the striking characters which distinguish the different species of the same genus, some of which grow at the sources of rivers, and others at the place of their discharge into the Ocean. He would afterwards examine its convolvuluses, its mosses, its mistletoes, its scolopendræ, the mushrooms of its roots, nay, the very grasses which grow under its shade. He would perceive, in each of its vegetables, new

* Mississippi.

elementary relations, adapted to the places which they occupy, and to the tree which sustains, or shelters them.

His attention might next be directed to the various species of animals which resort to it as a habitation, and he would presently be convinced, that, from the snail up to the squirrel, there is not a single one, but what has determinate and characteristic relations to the dependencies of its vegetation.

If the tree in question were growing in a forest, itself too of considerable antiquity, it would, most probably, have, in its vicinity, the tree which Nature designed should contrast with it in the same site, as, for example, the birch with the fir. It is farther probable, that the accessory vegetables and animals of this last, would, in like manner, form a contrast with those of the first. These two spheres of observation would mutually illuminate each other, and would diffuse the clearest light over the manners of the animals which frequent them. We should then have a complete chapter of that immense and sublime History of Nature, the alphabet of which is hitherto unknown to us.

I am fully convinced, that without fatigue, and almost without any trouble, discoveries the most curious might be made; were we to restrict our enquiries but to one single compartment, we should discover a multitude of the most enchanting harmonies. In order to enjoy some imperfect sketches of this kind, we must have recourse to travellers. Our Ornithologists, fettered by methods and system, only think of swelling their catalogue, and distinguish nothing in birds save the feet and the bill. It is not in the nests that they observe them, but in hunting, and in their pouch. They even consider the colours of their plumage as accidents. It was not by chance, however, that Nature, on the shores of Brasil, bestowed a beautiful carnation colour, with a border of black, on the extremity of the wings of the *Ouara*, a species of curlew, which inhabits the sea green foliage of the *paletuvier*,

which grows in the bosom of the waves, and bears no apparent flowers. The *savia*, another bird of the same climate, is yellow over the belly, with the rest of the plumage gray. It is about the size of a sparrow, and perches on the pepper plant, the flowers of which have no lustre, but whose grains are eaten by this bird, and resown wherever she takes her flight.

To those correspondencies must be joined such as pertain to site, which itself derives so much beauty from the overshadowing vegetable. These harmonies are detailed by Father *Francis d'Abbeville*. If credit is to be given to the History of voyages by the Abbé *Prevost*, there is, on the banks of the Senegal, a fluviatric tree, the leaves of which are thorny, and the branches pendant, in form of an arch. It serves as a habitation to birds called kurbalos, or fishers, of the size of a sparrow, variously coloured. Their bill is very long, and armed with little teeth, resembling a saw. They build a nest of the bulk of a pear, composed of earth, feathers, straw, moss, and attach it to a long thread, suspended from the extremity of the branches which project over the river, in order to secure it from the serpents and monkeys, which sometimes contrive to clamber up after them. You would take those nests, at a little distance, for the fruit of the tree: And some of those trees contain to the number of a thousand. You perceive the kurbalos fluttering incessantly along the water, and entering into their nests with a motion that dazzles the eyes.

According to Father *Charlevoix*, there grows in Virginia, on the brink of the lakes, a laurel leaved yew tree, which pushes several stems from its root, the branches of which embrace all the surrounding trees, and climb to the height of more than sixteen feet. They form, in Summer, an impenetrable shade, and in Winter a temperate retreat for the birds. Its flowers have no very striking appearance, and its fruit grows in round clusters, loaded with black grains. This yew has for its principal inhabitant,

a very beautiful kind of jay. The head of that bird is adorned with a long black crest, which it can erect at pleasure. Its back is of a deep purple. The wings are black on the inside, blue externally, and white at the extremities, with white stripes across every feather. Its tail is blue, and marked with the same stripes as the wings; and its cry is far from being disagreeable.

There are birds which lodge not upon their favourite plant, but opposite to it. Such is the colibri, which frequently nestles, in the Antilles Islands, on the straw which thatches a cottage, in order to live under the protection of Man. In our climates, the nightingale constructs his nest under covert of a bush, choosing, in preference, such situations as repeat an echo, and carefully observing to expose it to the morning sun. Having employed such precautions, he takes his station in the vicinity, against the trunk of a tree; and there, confounded with the colour of its bark, and motionless, he becomes invisible. But he presently animates the obscure retreat which he has chosen, by the divine melody of his song, and effaces all the brilliancy of plumage, by the charms of his music.

But whatever enchantment may be diffused by plants and animals over the situations which have been assigned to them by Nature, I never can consider a landscape as possessing all its beauty, unless I perceive in it, at least, one little hut. The habitation of Man confers, on every species of vegetable, a new degree of interest or of majesty. Nothing more is necessary, in many cases, than a tree, in order to characterize, in a country, the wants of a whole Nation, and the care of Providence. I love to see the family of an Arab under the date tree of the desert, and the boat of an islander of the Maldivias loaded with coconuts, under the cocoa trees of their gravelly strands. The hovel of a poor unindustrious Negro gives me pleasure, under the shade of a great gourd plant, which exhibits his complete set of household furniture. Our magnificent hotels, in great cities, are the habitations of tradesmen

merely : In the country, they are transformed into castles, palaces, temples. The long avenues which announce them confound themselves with those which form the communication of empires. This is not, in truth, what I consider as most interesting in rural scenery. To the most ostentatious exhibition of splendor, I have frequently preferred the view of a little hamlet of fishermen, built by the side of a river. With inexpressible delight have I sometimes reposed, under the shade of the willows, and of the poplars, on which were suspended the bow nets, composed of their own branches.

I shall now proceed, in my usual superficial manner, to take a rapid glance of the harmonies of plants with Man ; and, in order to introduce, at least, something of order into a subject so rich in matter, I shall farther divide those harmonies, relatively to Man himself, into *elementary*, into *vegetable*, into *animal* and into *human*, properly so called, or *alimentary*.

HUMAN HARMONIES OF PLANTS.

Elementary Harmonies of Plants relatively to Man.

If we consider the vegetable Order under the simple relations of strength and magnitude, we shall find it divided, with a sufficient degree of generality, into three great classes, namely, into herbs, into shrubs and into trees. It is to be remarked, in the first place, that herbs are of a substance pliant and soft. Had they been ligneous and hard, like the young boughs of trees, to which it might appear they ought naturally to have a resemblance, as they grow on the same soil ; the greatest part of the Earth would have been inaccessible to the foot of Man,

till the fire, or the hatchet, had cleared the way for him. It was not by chance, therefore, that so many grasses, mosses and herbs, assumed a soft and yielding texture, nor from want of nourishment, nor of the means of expansion ; for some of those herbs rise to a very great height, such as the banana of India, and several ferulaceous plants of our own climates, which attain the stature of a little tree.

On the other hand, there are ligneous shrubs, which do not exceed the generality of herbs in height; but they grow, for the most part, on rugged and steep places, affording to Man the means of clambering up with facility, for they shoot out of the very clefts of the rocks. But as there are rocks which have no clefts, and which present the perpendicularity of a wall, there are likewise creeping plants which take root at their bases, and which, fixing themselves to their sides, rise in close cohesion to a height surpassing that of many of the tallest trees : Such are the ivy, the virgin vine, and a great number of the *lianne* tribe, which mantle along the rocks of southern regions.

Were the Earth covered with vegetables of this sort, it would be impossible to walk over it. It is very remarkable, that when uninhabited islands were discovered, some were found clothed with forests, as the Island of Madeira; others in which there was nothing but herbage and rushes, as the Malouine Islands, at the entrance of Magellan's Strait; others carpeted with mosses simply, such as several little isles on the coast of Spitzbergen; others, in great number, on which these several vegetables were blended; but I do not know of a single one which was found to contain only shrubbery and liannes. Nature has placed this class only on places not easily to be scaled, in order to facilitate access to Man. It may be affirmed, that no precipice presents a surface so perpendicular as to be insurmountable, with their assistance. Thus aided,

the ancient Gauls were on the point of storming the capitol.

As to trees, though they are replenished with a vegetative force, which elevates them to a very considerable height, the greater part of them do not send out their first branches but at a certain distance from the ground. So that though they form, when they have attained a certain degree of elevation, an intertexture impenetrable to the Sun, which they extend to a great distance around, they leave, however, about their roots, avenues sufficient to render them accessible, so that the forests may be traversed with ease and expedition.

Such, then, are the general dispositions of vegetables upon the Earth, relatively to the occasion which Man had to range over it. The herbage serves as a carpet to his feet; the shrubbery as a scaling ladder to his hands; and the trees are as so many parasols over his head. Nature, after having established those proportions between them, has distributed them in all the varieties of situation, by bestowing on them, abstractedly from their particular relations to the elements, and to the animal creation, qualities the best adapted to minister to the necessities of Man, and to compensate, in his favour, the inconveniences of climate.

Though this manner of studying her Works be now held in contempt by most Naturalists, to it, however, shall our researches be limited. We have just been considering plants according to their shape and size, after the manner of gardeners; we proceed farther to examine them as is done by the wood feller, the huntsman, the carpenter, the fisherman, the shepherd, the sailor, nay, the nose-gay maker. It is of small importance whether we are learned, provided we cease not to be men.

It is in the countries of the North, and on the summit of cold mountains, that the pine grows, and the fir, and the cedar, and most part of resinous trees, which shelter man from the snows by the closeness of their foliage, and

which furnish him, during the Winter season, with torches and fuel for his fire side. It is very remarkable, that the leaves of those evergreen trees are filiform, and extremely adapted, by this configuration, which possesses the farther advantage of reverberating the heat, like the hair of animals, for resistance to the impetuosity of the winds, that beat with peculiar violence on elevated situations. The Swedish Naturalists have observed, that the fattest pines are to be found on the driest and most sandy regions of Norway. The larch, which takes equal pleasure in the cold mountains, has a very resinous trunk.

Mathiola, in his useful commentary on *Dioscorides*, informs us, that there is no substance more proper than the charcoal of these trees, for promptly melting the iron minerals, in the vicinity of which they peculiarly thrive. They are, besides, loaded with mosses some species of which catch fire from the slightest spark. He relates, that being obliged, on a certain occasion, to pass the night in the lofty mountains of the Strait of Trento, where he was botanizing, he found there a great quantity of larches (*larix*) bearded all over, to use his own expression, and completely whitened with moss. The shepherds of the place, willing to amuse him, set fire to the mosses of some of those trees, which was immediately communicated with the rapidity of gunpowder touched with the match. Amidst the obscurity of the night, the flame and the sparks seemed to ascend up to the very Heavens. They diffused, as they burnt, a very agreeable perfume. He farther remarks, that the best agaricum grows upon the larch, and that the arquebusers of his time made use of it for keeping up fire, and for making matches. Thus Nature, in crowning the summit of cold and ferruginous mountains with those vast vegetable torches has placed the match in their branches, the tinder at their foot, and the steel at their roots.

To the South, on the contrary, trees present, in their foliage, fans, umbrellas, parasols. The latanier carries

each of its leaves plaited as a fan, attached to a long tail, and similar, when completely displayed, to a radiating Sun of verdure. Two of those trees are to be seen in the Royal Garden. The leaf of the banana resembles a long and broad girdle, which, undoubtedly, procured for it the name of Adam's fig tree. The magnitude of the leaves of several species of trees increases in proportion as we approach the Line. That of the cocoa tree, with double fruit, of the Sechelles Islands, is from twelve to fifteen feet long, and from seven to eight broad. A single one is sufficient to cover a numerous family. One of those leaves is, likewise, to be seen in the Royal Cabinet of Natural History. That of the talipot of the Island of Ceylon is of nearly the same size.

The interesting and unfortunate *Robert Knox*, who has given the best account of Ceylon which I am acquainted with, tells us, that one of the leaves of the talipot is capable of covering from fifteen to twenty persons. When it is dry, continues he, it is at once strong and pliant, so that you may fold and unfold it at pleasure, being naturally plaited like a fan. In this state it is not bigger than a man's arm, and extremely light. The natives cut it into triangles, though it is naturally round, and each of them carries one of those sections over his head, holding the angular part before, in his hand, to open for himself a passage through the bushes. The soldiers employ this leaf as a covering to their tents. He considers it, and with good reason, as one of the greatest blessings of Providence, in a country burnt up by the Sun, and inundated by the rains, for six months of the year.

Nature has provided, in those climates, parasols for whole villages; for the fig tree, denominated, in India, the fig tree of the Banians, a drawing of which may be seen in *Tavernier*, and in several other travellers, grows on the very burning sand of the sea shore, throwing, from the extremity of its branches, a multitude of shoots, which drop to the ground, there take root, and form, a-

round the principal trunk, a great number of covered arcades, whose shade is impervious to the rays of the Sun.

In our temperate climates, we experience a similar benevolence on the part of Nature. In the warm and thirfty season, she bestows upon us a variety of fruits, replenished with the most refreshing juices, such as cherries, peaches, melons ; and, as Winter approaches, those which warm and comfort by their oils, such as the almond and the walnut. Certain Naturalists have considered even the ligneous shells of these fruits, as a preservative against the cold of the gloomy season ; but these are, as we have seen, the means of floating and of navigating. Nature employs others, with which we are not acquainted, for preserving the substances of fruits, from the impressions of the air. For example, she preserves, through the whole Winter, many species of apples and pears, which have no other covering than a pellicle so very thin, that it is impossible to determine how fine it is.

Nature has placed other vegetables in humid and in dry situations, the qualities of which are inexplicable on the principles of our Physics, but which admirably harmonize with the necessities of the men who inhabit those places. Along the water side grow the plants and the trees which are the dryest, the lightest, and, consequently, the best adapted to the purpose of crossing the stream. Such are reeds, which are hollow, and rushes, which are filled with an inflammable marrow. It requires but a very moderate bundle of rushes to bear the weight of a very heavy man upon the water. On the banks of the lakes of the North are produced those enormous birch trees, the bark of a single one of which is sufficient to form a large canoe. This bark is similar to leather in pliancy, and so incorruptible by humidity, that, in Russia, I have seen some of it extracted from under the earth which covered powder magazines, perfectly sound, though it had lain there from the time of *Peter the Great*.

If we may depend on the testimony of *Pliny* and of *Plutarch*, there were found at Rome, four hundred years after the death of *Numa*, the books which that great King had commanded to be deposited with his body in the tomb. The body was entirely consumed; but the books, which treated of Philosophy and Religion, were in such a state of preservation, that *Petilius*, the Pretor, undertook to read them, by command of the Senate. On the report which he made respecting their contents, they were ordered to be burnt. They were written on the bark of the birch tree. This bark consists of an accumulation of ten or twelve sheets, white and thin, like paper, the place of which it supplied to the ancients.

Nature presents to Man different trajectories on different shores. She has planted, on the banks of the rivers of India, the bamboo, an enormous reed, which rises there sometimes to the height of sixty feet, and swells to the size of a man's thigh. The part comprehended between two of its joints is sufficient to bear a man up on the water. The Indian places himself upon it a straddle, and so crosses a river, swimming along by the motion of his feet. The Dutch Navigator, *John Hugo de Linschotten*, an author of reputation, assures us that the crocodile never touches persons who are passing rivers in this manner, though he frequently attacks canoes, and even the boats of Europeans. *Linschotten* ascribes the abstinence of this voracious animal to an antipathy which he has to that species of reed.

Francis Pyrard, another traveller, who has observed Nature with a careful eye, informs us, that there grows, on the shores of the Maldivia Islands, a tree called *candou*, the wood of which is so light, that it serves as cork for the fishermen.* I think I was once possessed of a log of wood of that species. It was stripped of the bark, perfectly white, of the thickness of my arm, about six feet

* See *Pyrard's Voyage to the Maldivia Islands*, page 38.

long, and so light, that I could easily lift it by my finger and thumb. In these same islands, and on the same strands, rises the cocoa tree, which there attains a higher degree of beauty than any where else in the World. Thus, the tree of all others most useful to mariners, grows on the shores of the Seas most frequented by men of that description. All the world knows that the vessel is there constructed of its timber, that its leaves are formed into sails, that the trunk serves for a mast, that the hempen substance called *caira*, which surrounds its fruit, is wrought into cordage, and when the whole is ready for sea, a cargo of cocoa nuts is the lading. It is farther remarkable, that the cocoa nut, before it comes to perfect maturity, contains a liquor which is an excellent antiscorbutic.

Is it not, then, a miracle of Nature, that this fruit, replenished with such milk, should come to perfection on the barren strand, and within the washing of the briny Deep? Nay, it is only on the brink of the Sea, that the tree which bears it arrives at its highest beauty; for few are to be seen in the interior of countries.

Nature has placed a palm tree of the same family, but of a different species, on the summit of the mountains of the same climates: It is the palmist. The stem of this tree is sometimes above a hundred feet high, is perfectly straight, and bears on its summit, all the foliage which it has, a bunch of palms, from the midst of which issues a long roll of plaited leaves, resembling the staff of a lance. This roll contains, in a sort of coriaceous sheath, leaves ready to shoot, which are very good eating before their expansion. The trunk of the palmist is woody only at the circumference, and it is so hard as to resist the edge of the best tempered hatchet. It may be cleft, with the utmost ease, from end to end, and is filled, inwardly, with a spongy substance, which may be easily separated. Thus prepared, it serves to form, for conducting waters, frequently diverted from their course by the rocks which are at the summit of mountains, tubes which are not corrupt-

ible by humidity. Thus the palm tree gives to the inhabitants of those regions the means of constructing aqueducts at the source of rivers, and ships at the place of their discharge.

Other species of trees render them the same services, in other situations. On the shores of the Antilles Islands grows the *acajou*, there called, but improperly, the cedar, on account of its incorruptibility. It arrives at such a prodigious size, that out of one log of it they make a boat capable of carrying so many as forty men.* This tree possesses another quality, which, in the judgment of the best observers, ought to render it invaluable for the marine service; namely this, that it is the only one, of those shores, which is never attacked by the sea worm, an insect so formidable to every other species of timber which floats in those seas, that it devours whole squadrons in a very little time, and, in order to preserve them, lays us under the necessity, these many years past, of sheathing their bottoms with copper. But this beautiful tree has found enemies more dreadful than the worm, in the European inhabitants of those Islands, who have almost extirpated the whole race of them.

The manner in which Providence has contrived a supply for the thirst of Man, in sultry places, is no less worthy of admiration. Nature has placed, amidst the burning sands of Africa, a plant whose leaf, twisted round like a cruet, is always filled with a large glass full of fresh water; the gullet of this cruet is shut by the extremity of the leaf itself, so as to prevent the water from evaporating. She has planted on some parched districts of the same country, a great tree, called by the Negroes *Boa*, the trunk of which, of a prodigious bulk, is naturally hollowed like a cistern. In the rainy season it receives its fill of water, which continues fresh and cool, in the greatest heats, by means of the tufted foliage which crowns

* Consult Fathers *Labat* and *Du Tertre*.

its summit. Finally, she has placed vegetable fountains on the parched rocks of the Antilles. There is commonly found there a lianne, called the water lianne, so full of sap, that if you cut a single branch of it, as much water is immediately discharged as a man can drink at a draught : It is perfectly pure and limpid.

In the swamps of the Bay of Campeachy, travellers find relief of another kind. Those swamps, on a level with the Sea, are almost entirely inundated in the rainy season, and became so parched on the return of dry weather, that many huntsmen who had happened to miss their way in the forests, with which they are covered, actually perished with thirst. The celebrated traveller *Dampier* relates, that he several times escaped this calamity, by means of a very extraordinary species of vegetation, which had been pointed out to him on the trunk of a kind of pine very common there ; it resembles a packet of leaves, piled one over another in tiers ; and on account of its form, and of the tree on which it grows, he calls it the pine apple. This apple is full of water, so that on piercing it at the basis with a knife, there immediately flows from it a good pint of very clear and wholesome water. Father *du Tertre* informs us, that he has several times found a similar refreshment in the leaves, rounded like a cornet, of a species of balizier, which grows on the sandy plains of Guadaloupe. I have been assured by many of our sportsmen, that nothing was more proper for the quenching of thirst than the leaves of the mistletoe, which grows on many trees.

Such are, in part, the precautions employed by Providence for compensating, in favour of Man, the inconveniencies of every climate ; by opposing to the qualities of the elements, contrary qualities in vegetables. I shall pursue them no farther, for I believe the subject to be inexhaustible. I am persuaded, that every Latitude, and every season, has its own, which are appropriated to it,

and that every parallel varies them in every degree of Longitude.

Vegetable Harmonies of Plants with Man.

Were we now to examine the vegetable relations of plants to Man, we should find them to be infinite in number ; they are the perpetual sources of our arts, of our manufactures, of our commerce, and of our enjoyments ; but, in our usual way, we shall just run over a few of their natural and direct relations, with which Man has intermingled nothing of his own.

To begin with their perfumes, Man appears to me the only being, endowed with sensibility, who is affected by these. Animals, it is granted, and especially bees and butterflies, have certain plants proper to themselves, which attract or repel them by their emanations ; but these affections seem to be connected with their necessities. Man alone is sensible to the perfume and lustre of flowers, independently of all animal appetite. The dog himself, who, from his domestic habits, assumes so powerful a tincture of the manners and of the tastes of Man, appears totally insensible to that enjoyment. The impression which flowers make upon us, seems connected with some moral affection ; for there are some which enliven us, whereas others dispose us to melancholy, without our being able to assign any other reasons for it than those which I have endeavoured to unfold, in examining some general Laws of Nature.

Instead of distinguishing them as yellow, red, blue, violet, we might divide them into gay, into serious, into melancholy : Their character is so expressive, that lovers, in the East, employ their shades, to describe the different degrees of their passion. Nature makes frequent

use of it, relatively to us, with the same intention. When she wants to keep us at a distance from a marshy and unwholesome place, she scatters there poisonous plants, which present dingy colours, and offensive smells. There is a species of arum, which grows in the morasses of Magellan's Strait, whose flower exhibits the appearance of an ulcer, and exhales an odour so strong of putrid flesh, that the flesh fly resorts to it to deposit her eggs.

But the number of fetid plants is of no great extent. The Earth is clothed with flowers which, for the most part, have very pleasing hues and perfumes. I wish time would permit me to say something of the simple aggregation of flowers. This subject is so vast, and so rich, that I hesitate not to affirm, that it presents ample employment for the most famous Botanist in Europe, through his whole life, by discovering to him every day some new beauty, and that without removing above a league from his own habitation. All the art with which jewellers dispose their gems disappears before that which Nature displays in the assortment of flowers.

I shewed *J. J. Roussseau* the flowers of different trefoils, which I had picked up, as I was walking with him : Some of them were disposed in crowns, in half crowns, in ears, in sheaves, with colours endlessly varied. While they were yet on their stems, they had besides other aggregations, with the plants which were frequently opposed to them, in colours and in forms. I asked him, whether Botanists gave themselves any trouble about those harmonies : He told me no ; but that he had advised a young Painter, of Lyons, to learn Botany, with a particular view to study in it the forms and the assemblages of flowers ; and that he had thus become one of the most celebrated pattern drawers in Europe. On this subject, I quoted to him a passage from *Pliny*, with which he was highly delighted : It relates to a Painter of Sicyon, named *Paufias*, who learned, by means of this study, to paint flowers at least as well as he of Lyons knew how to draw them : He had, in truth,

a master as skilful as Nature herself, or rather one and the same with her, namely, Love.

I shall give this story in the simplicity of style of the old Translator of *Pliny*, in order to preserve all its vivacity.* “ In his youth he became enamoured of a nosegay girl, of the same city with himself; her name was *Glycera*; she was very pretty, and had a singularly elegant taste in assorting, a thousand different ways, the flowers of nosegays and chaplets; so that *Pausias*, copying after Nature the chaplets and nosegays of his mistress, rendered himself, at length, perfect in that art. Last of all, he painted her seated, in the action of composing a chaplet of flowers; and this picture is considered as his great masterpiece: He called it *Stephano Plocos*, the garland weaver, because *Glycera* had no other means of relieving the pressure of poverty, but making and selling garlands and nosegays. And it is confidently affirmed, that *L. Lucullus* gave to *Dionysius*, of Athens, two talents, for a simple copy of this picture.”

This anecdote must have been singularly pleasing to *Pliny*, for he has repeated it in another place†: “ Those of Peloponesus,” says he, “ were the first who regulated the colours and the smells of the flowers of which chaplets were composed. It was, however, originally the invention of *Pausias*, a Painter, and of a nosegay girl, named *Glycera*, with whom he was violently in love; whence he was engaged to imitate to the life the chaplets and nosegays which she composed. But the girl varied in so many ways the arrangement of the flowers of her chaplets, in order to teaze and employ her lover, that it afforded very high amusement to behold the skill of the Painter *Pausias*, and the natural production of *Glycera*, striving for the superiority.

Ancient Nature is still better acquainted with the subject, than is the young *Glycera*. As it is impossible to

* *Pliny's Natural History*, book xxxv. chap. ii.

† *Idem*, book xxi. chap. ii.

follow her in her infinite variety, we shall make, at least, one observation respecting her regularity. It is this, that there is not any one odoriferous flower, but what grows at the foot of Man, or at least within reach of his hand. All those of this description are placed on herbage, or on shrubbery, as the heliotrope, the pink, the gilliflower, the violet, the rose, the lilach. Nothing similar to these grows on the lofty trees of our forests; and if some flowers of brilliant appearance are displayed on certain tall trees of foreign countries, such as the tulip tree, and the great chestnut of India, they have no very pleasant smell. Some trees of India, it is admitted, as the spice bearing plants, are perfumed all over; but their flowers are not very showy, and do not partake of the odour of their leaves. The flowers of the cinnamon tree smell like human excrement: This I know to be true by experience; if, however, the trees which were shewed to me in the Isle of France, in a plantation belonging to Mr. *Magon*, were the real cinnamon. The beautiful and fragrant flower of the magnolia grows on the lower part of the plant. Besides, the laurel which bears it is, as well as spice trees, a plant of no great elevation.

It is possible I may be mistaken in some of my observations; but supposing them multiplied, with respect to the same object, and attested by persons of veracity, and exempted from the spirit of system, I am able to deduce general consequences from them, which ought not to be a matter of indifference to the happiness of Mankind, by demonstrating to him the invariable intentions of benevolence in the AUTHOR of Nature. The varieties of their adaptation reflect mutual light; the means are different, but the end is constantly the same. The same goodness which has placed the fruit destined for the nourishment of Man, within reach of his hand, must have likewise disposed his nosegay with similar attention to his conveniency. It may be here remarked, that our fruit trees are easily scaled, and different in this respect, from most forest trees.

Farther, all those which produce fruits that are soft, when in a state of perfect maturity, and which would have been liable to be bruised in falling, such as the fig tree, the mulberry, the plum, the peach, the apricot, present their crop at a small distance from the ground : Those, on the contrary, which yield hard fruit, and such as have nothing to risk from falling far, carry it aloft, as walnut trees, chestnuts and cocoas.

There is no less marvellousness of adaptation in the forms and sizes of fruits. Many of them are moulded for the mouth of Man, such as cherries and plums ; others for his hand, such as pears and apples ; others much larger, such as melons, have the subdivisions marked, and seem destined to be a social family repast : Nay, there are some in India, as the jacque, and with ourselves the pumpkin, large enough to be divided among a neighbourhood. Nature appears to have observed the same proportions in the various sizes of the fruits destined to the nutriment of Man, as in the magnitude of the leaves which are designed to afford him a shade in hot countries ; for of these some are contrived to be a shelter for a single person, others for a whole family, and others for all the inhabitants of the same hamlet.

I shall not dwell long on the other relations which plants have with the habitation of Man, from their greatness and their attitude, though many very curious observations might be suggested on that subject. There are few of them but what are capable of embellishing his field, his roof, or his wall. I shall only remark, that the vicinity of Man is beneficial to many plants. An anonymous missionary relates, that it is firmly believed by the Indians, that the cocoa trees which have houses around their roots, become much more beautiful than those where there are none ; as if that useful tree took delight in being near the habitation of Man.

Another missionary, a bare footed Carmelite, called Father *Philippe*, positively asserts, that when the cocoa tree

is planted close by houses or huts, it is rendered more fruitful by the smoke, by the ashes, and other circumstances connected with a human dwelling, so as to produce double the quantity of fruit. He adds, that, for this reason, the places in India which consist of palm plantations, are crowded with houses and little cabins ; and that the proprietors of those plantations give, at first, a pecuniary premium, as an inducement to come and live there, together with part of the crop when it is reaped. He farther adds, that though their fruits, which are very large and hard, frequently fall down from the trees, when they have attained a state of full maturity, either by the gnawing of the rats, or by the violence of the winds, there is not a single instance known of any person's being hurt by the fall. This appears to me no less extraordinary than it did to him.*

I might extend the influences of Man to several of our fruit trees, especially the apple tree and the vine. I never saw finer apple trees in the *Pais de Caux*, than those which grow around the habitations of the peasantry. It is true that the attention of the proprietor may have greatly contributed to this. I have sometimes felt myself stopped in the streets of Paris, to contemplate with delight small vines, the roots of which are in the sand, and under the pavement, enriching with their clusters the complete front of a guard house. One of them, I think about six or seven years ago, produced two crops in one year, as was announced in the public prints.

* See *Voyage to the East*, of R. P. *Philippé*, a white friar, Book vii. chap. 5. section 4.

Animal Harmonies of Plants with Man.

But Nature was not satisfied with having given to Man a bower, and a carpet, loaded with fruit ; this would not have availed him, had she not likewise furnished him, in the vegetable order itself, the means of defence against the depredations of wild beasts. In vain would he have watched over the preservation of his property through the day, had it been exposed to pillage during the night. She has bestowed a prickly shrubbery to enclose him round and round. The farther we advance southward, we find the greater variety in the species of these. But, on the contrary, we see few, if any, of those thorny shrubs in the North, where they appear useless ; there being no orchards to defend. They seem to be produced, in both Indies, for every kind of situation. Though I have been only on the selvage, as I may say, of those countries, I have seen there a great number of such shrubs, the study of which presented a great variety of curious remarks to a Naturalist.

Among others, I took particular notice of one, in a garden on the Isle of France, which to me appeared proper for composing a fence impenetrable to the smallest of quadrupeds. It rises in form of a stake, about the thickness of a man's arm, quite straight, without branches, and bearing no verdure except a small bunch of leaves on its summit. Its bark is bristled all over with very strong, and very sharp prickles. It attains the height of seven or eight feet, and grows as thick above as below. A series of these shrubs, planted close to each other, would form a real palisado, without the smallest interval. The opuntia and the taper, so common under the Torrid Zone, are armed with prickles so keen, that they pierce the soles of your

shoes if you venture to walk over them. There is not a tyger, or lion, or elephant, that dares to approach them. There is another species of thorn, in the Island of Ceylon, which is employed as a defence against Man himself, accustomed as he is to force his way through every obstacle. *Robert Knox*, whom I have before quoted, informs us, that the avenues of the kingdom of Candy, in the Island of Ceylon, are blockaded only with faggots of those thorns, with which the inhabitants obstruct the passes of their mountains.

Man finds in vegetables, protection not only against ferocious animals, but against reptiles and insects. *Father du Tertre* tells us, that he one day found, in the Island of Gaudaloupe, at the foot of a tree, a creeping plant, the stem of which presented the figure of a serpent. But he was much more surprised on perceiving seven or eight snakes lying dead around it. He communicated this discovery to a medical man, who, by means of it, performed many wonderful cures, by employing it in the cases of persons bitten by those dangerous reptiles. It is generally diffused over the rest of the Antilles Islands, in which it is known by the name of snake wood. It is likewise found in the Eastindies. *John Hugo de Linschotten* ascribes to it the same figure, and the same qualities.

We have, in our own climates, vegetables which present very strange correspondencies and contrasts with reptiles. *Pliny* tells us, that serpents are very fond of the juniper and the fennel, but that they are rarely found under the fern, the trefoil, the ash weed, and the rue ; and that betony kills them. Other plants, as has already been mentioned, destroy flies, such as certain species of the dionæa. *Thevenot* assures us, that in the Indies, grooms defend their horses from the flies, by rubbing them every morning with the flowers of the pumpkin. The fleabane, which bears black and shining grains, resembling a flea, clears the house of that vermin, if *Dioscorides* is to be credited. The echium, which has its seed formed like the head of a viper,

is fatal to those reptiles. It is probable, that, from such configurations, men, in the earlier ages of the World, discovered the relations and the oppositions between plants and animals. I am disposed to believe, that each genus of insect has its destructive vegetable with which we are unacquainted. In general, all vermin shuns perfume.

Nature has farther given us, in plants, the first patterns of nets for hunting and fishing. There grows on certain heaths in China, a species of ratan, so interwoven and so strong, as to catch and hold fast the stag, though in full vigour. I myself have seen on the sands of the sea shore in the Isle of France, a species of lianne, called the false potatoe, which covers whole acres, like a vast fishing net. It is so perfectly adapted to this very purpose, that the Negroes actually employ it in fishing. They form, with the stems and foliage of it, a very long series of cordages, which they cast into the sea; and having disposed them in a chain encompassing a great space on the water, they draw it ashore by the two extremities. They scarcely ever fail to bring out fish,* for the fishes are terrified, not only by a net which encloses them, but by every unknown substance which forms a shade on the surface of the water. By employing an industry equally simple, and nearly similar, the inhabitants of the Maldivia Islands carry on fisheries to a prodigious extent, employing no other means to decoy the fish into their receptacles, except a cord floating on the water, with the help of sticks.

Human, or elementary Harmonies of Plants.

There is not a single plant on the face of the Earth, but what has certain relations to the necessities of Man, and

* See Francis Pyrard's Voyage to the Maldivias.

which does not serve, somewhere or another, for clothing to him, for a shelter, for pleasure, for medicine, or, at least, for fuel. Some, which with us are entirely useless, are in high estimation in other parts of the World. The Egyptians put up frequent and fervent prayers for a plentiful crop of nettles, from the seeds of which they extract an oil, while the stem furnishes them with a thread, which they weave into excellent cloth. But those general relations, being innumerable, I shall confine myself to a few particular observations, respecting the plants which minister to the first of human wants, I mean the food of Man.

We remark, first, that corn, which serves for the general subsistence of the Human Race, is not produced by vegetables of a lofty stature, but by simple grasses. The principal support of human life is borne on herbage, and is exposed to the mercy of every breath of wind. There is reason to believe, that had we ourselves been intrusted with the safety of our crops, we would not have failed to place them on great trees; but in this, as well as in every thing else, we are bound to admire Divine Providence, and to mistrust our own wisdom. Had our harvests been the produce of the forests, in the event of these being destroyed by war, or set on fire through our own imprudence, or rooted up by the winds, or ravaged by inundations, whole ages would have been requisite to reproduce them in a country. Farther, the fruits of trees are much more liable to drop off, than the seeds of grasses. The grasses, as has been already observed, carry their flowers in an ear, in many cases surmounted by little beards, which do not defend their seeds from the birds, as *Cicero* says, but which serve, as so many little roofs, to shelter them from the water which falls from Heaven. The drops of the rain cannot drown them, as they do flowers radiated, in disks, in roses and in umbels, the forms of which, however are adapted to certain places and to certain seasons; but those of the grasses are adapted to every exposure.

When they are borne in flowing and drooping plumes, such as those of most grasses of hot countries, they are sheltered from the heat of the Sun; and when collected into an ear, as those of most grasses of cold countries, they reflect his rays on at least one side. Farther, by the suppleness of their stems, strengthened by joints from distance to distance, and by their filiform and capillaceous leaves, they escape the violence of the winds. Their weakness avails them more than strength does the great trees. Like small fortunes, they are resown and multiplied, by the very same tempests which lay waste the vast forests.

They farther resist the effect of excessive dryness by the length of their roots, which go, in quest of moisture, a great way under ground; and though their leaves are narrow, they have them in such numbers, that they cover the face of the ground with plants endlessly multiplied. At the slightest shower, you see them all rear themselves into the air, at their extremities, as if they were so many claws. They even resist conflagration, which consumes so many trees in the forest. I have seen countries in which they every year set the herbage on fire, in the season of drought, recover themselves, as soon as it rained, with the most lovely verdure. Though this fire be so active, as frequently to devour, root and branch, the trees which come into contact with it, the roots of herbage sustain no great injury from it.

They have, moreover, the faculty of reproducing themselves in three different ways, by shoots which push away from their roots, by creeping branches, which they extend to a distance, and by grains extremely volatile or indigestible, which the winds and the animals scatter about on every side. The greatest part of trees, on the contrary, naturally regenerate themselves only by their seeds. Add to the general advantages of grasses, an astonishing variety of characters, in their florification and in their attitudes, which renders them more proper than vegeta-

bles of every other class, to grow in every variety of situation.

It is in this cosmopolite family, if I may be allowed the expression, that Nature has placed the principal aliment of Man; for the various species of corns, on which so many human tribes subsist, are only so many species of grasses. There is no land on the Globe where some kind of corn or another may not be raised. *Homer*, who had studied Nature so accurately, frequently characterizes each country by the vegetable peculiar to it. One island he celebrates for its grapes, another for its olive trees, a third for its laurels, and a fourth for its palms; but to the Earth only he gives the general epithet of *Ζεῖδωρα*, or corn giving. Nature, in fact, has formed it for growing in all situations, from the Line to the very border of the Frozen Ocean. One species is adapted to the humid places of warm countries, as the rice of Asia, which grows in vast abundance in the muddy swamps by the side of the Ganges. Another is suited to the marshy grounds of cold countries; such is a kind of false oats, which naturally grows on the banks of the rivers of North America, and of which many savage Nations annually raise immense crops.*

Other kinds of corn thrive wonderfully well on warm and dry lands, as the millet and the pannick of Africa, and the maize of Brazil. In our climates, wheat agrees best with a strong soil, rye with a sandy one, buckwheat with rainy declivities, oats with humid plains, barley with stony ground. Barley succeeds in the very bosom of the North. I have seen, as far up as the sixty first degree of North Latitude, amidst the rocks of Finland, crops of this grain as beautiful as ever the plains of Palestine produced.

Corn affords an abundant supply to all the necessities of Man. With its straw he enjoys the means of

* Consult Father *Hennepin*, a Franciscan : *Chaplain*, and other Travelers through North America.

lodging, of covering, of warming himself, and of feeding his sheep, his cow and his horse; with its grain he can compound aliments and liquors of every flavour. The northern Nations brew it into beer, and distil from it strong waters, more potent than those from wine; such are the distillations of Dantzick. The Chinese* extract from rice, a wine as agreeable as the best wines of Spain. The Brasilians prepare their *ouicou* with maize. In a word, with oats torrefied, it is possible to compose a cream which shall have the perfume of the vanilla. If we unite with these qualities those of the other domestic plants, most of which likewise grow all over the Earth, we shall find in them the flavour of the clove, of pepper, of other spices; and without going farther than our own gardens, we shall be able to collect the delicacies scattered over the rest of the vegetable Creation.

We may distinguish, in the barley and the oats, the elementary characters which have been formerly indicated, and which vary the species of plants of the same genus, in a conformity to the situations where they are designed to grow. The barley destined to dry places has leaves broad and open at their base, which convey the rain water to the root of the plant. The long beards which surmount the coat that is wrapped round the grain, are bristled with denticulations, very much adapted to the purpose of making them adhere to the hair of animals, and of resowing them in lofty and dry situations. The oats, on the contrary, destined to humid places, have narrow leaves, gathered close around the stem, in order to intercept the rain water. The coats of this plant distended, similar to two long half bladders, and not very closely adhering to the grain, render it proper for floating, and crossing the water by the help of the winds. But here we are presented with a still more wonderful fact, which will confirm what has been advanced, respecting the uses of the differ-

* Journey to China, by *Isbrand Ides*.

ent parts of plants, relatively to the elements, and which extends the views of Nature even beyond the fructification, though we have considered this as the determining character ; it is, that barley, in rainy years, degenerates into oats, and that oats, in dry seasons, change into barley.

This observation, related by *Pliny*, *Galen* and *Mathiola*, the Commentator of *Dioscorides*,* has been confirmed by the experiments of several modern Naturalists. *Mathiola*, indeed, alleges, that this transformation of barley is not into oats properly so called, which he denominates *Bromos*, but into a plant which, at first sight, resembles it, and to which he gives the name of *Ægilops*. This transformation, demonstrated by the frequently repeated experiments of the husbandmen of his country, and by that which the father of *Galen* made, expressly for his own satisfaction; together with that of the flowers of the linarium, and of the leaves of many vegetables, are sufficient proof, that the elementary relations of plants, are only secondary relations, and that animal, or human, relations are the primary. Thus, Nature has placed the character of a plant, not only in the form of the fruit, but in the substance of that very fruit.

Hence I presume, that having formed, in general, of a mealy substance, the basis of human life, Nature has diffused it over all situations, on different species of grasses ; that afterwards, intending to add to this, certain modifications relative to some humors of the human temperament, or to some influence of season, or of climate, she has formed other combinations of it, which she has deposited in leguminous plants, such as pease and beans, which the Romans comprehended in the class of corn plants ; that, finally, she has formed another sort of it, which she has laid up in the fruits of trees, such as chestnuts, or in roots,

* See *Mathiæla* on *Dioscorides*, book iv. page 432.

as potatoes, and other farinaceous under ground vegetables.

Those adaptations of substance to every climate are so infallibly certain, that, in every country, the fruit which is most common there is the best, and the most wholesome. Hence I farther presume, that she has followed the same plan with respect to medicinal plants; and that having diffused over various families of vegetables, virtues relative to our blood, to our nerves, to our humours, she has modified them in every country, conformably to the diseases which the climate of each particular country generates, and has placed them in opposition with the particular characters of those same diseases. It is, in my opinion, from the neglect of these observations, that so many doubts and disputes have been excited respecting the virtues of plants. A simple, which, in one country, is an infallible cure for a malady, may, sometimes increase it in another. The Jesuits powder, which is the pounded bark of a species of fresh water manglier of Mexico, is a remedy for the fevers of America, of a kind peculiar to damp and hot situations, but frequently fails when applied to those of Europe. Every medicine is modified according to the place, just as every malady is.

I shall pursue this reflection no farther, as it would lead me into a deviation from my subject; but if Physicians would pay the attention to it which it merits, they must study more carefully the plants of their own country, and not prefer to them, as they generally do, those of foreign climates, which they are under the necessity of modifying a thousand different ways, in order to give them, as chance may direct, an adaptation to local maladies. One thing is certain, namely, that when Nature has determined a certain favour in any vegetable, she repeats it all over the Earth, with a variety of modifications, which do not, however, prevent our distinguishing its principal virtue. Thus, having placed the *cochlearia* (scurvy grafs) that powerful antiscorbutic, even on the foggy shores of Spitz-

bergen, she has repeated the favour and the medicinal qualities of it, in the cresses of our brooks, in the garden cresses, in the nasturtium, which is a cress of the rivers of Peru; in a word, in the very grains of the papaya, which grows in humid places of the Antilles Islands. We find, in like manner, the favour, the smell, and the medicinal qualities of our garlick, in the woods, the barks, and the mosses of America.*

* I must here observe that garlic, the smell of which is so formidable to our fine ladies, is, perhaps, the most infallible remedy in the World against the vapours, and all the nervous disorders to which women are so subject. Of this I have had repeated experience. Nay, *Pliny* goes so far as to assure us, that it is a cure for the epilepsy. It is, besides, an antiseptic; and every plant which has its smell, has also the same virtues. It is very remarkable, that plants which smell like garlic, usually grow in marshy places, as a remedy, provided by Nature, against the putrid emanations thence exhaled. Such is, among others, the *scordium*. *Galen* relates, that its antiseptic virtue became demonstrable from this, that after a battle, the dead bodies which happened to be in contact with plants of the *scordium*, were found to be in a much less putrid state than those which were not; and that those bodies remained fresh and sound chiefly in the parts which actually touched the plant. But the experiment which the Baron *Busbequius* made with it, upon living bodies, is still more striking. That great Man, on his return from the first journey which he made to Constantinople, was attended by a numerous retinue. A Turk of his suite was attacked with the plague and died. His companions resolutely divided his spoils among themselves, in defiance of the remonstrances of the Physician *Busbequius*, who assured them that the pestilence would thereby be immediately communicated. In fact, a few days after, the symptoms of that dreadful malady became apparent among them.

But let us permit the intelligent and virtuous Ambassador himself to give an account of the consequences of this alarming event. “The day after our departure from Adrianople,” says he, “they all came to him (the Physician) with a sad and dejected air, complaining of a violent headache, and imploring relief. They were perfectly sensible that they were affected with the first symptoms of the pestilence. My Physician remanded them severely, saying he was astonished how they dared to apply to him for a remedy from an evil of which he had forewarned them, and which they had obstinately persisted in bringing upon themselves. Not, however, that he intended to withhold any assistance which might be in his power. On the contrary, he became extremely uneasy about the means of relieving them: But where was the possibility of finding medicine on a road frequently subjected to a failure of the most com-

These considerations induce me to believe, that the elementary characters of plants, and their entire configuration; are only secondary means, and that their principal character is referrible to the necessities of Man. Thus, in order to establish in plants an order simple and agreeable, instead of running over successively their elementary, vegetable, animal, and human harmonies, it would be more proper to invert this order, but without changing it, and to set out with the plants which present to Man a supply for his first wants, to proceed thence to the uses which animals derive from them, and to conclude with the situations which determine their varieties.

This order may be followed so much the more easily, that the first point of departure is fixed by the smell and the taste. The testimony of these two senses is far from being contemptible; for they assist us in ascertaining the intimate qualities of plants, much better than the decompositions of Chemistry; it may be extended to the whole

“mon necessities of life? Providence became our only refuge, and we were effectually succoured in this trying hour. I am going to relate in what manner.

“It was my custom on our arrival at the different halting places on the road, to go a walking in the vicinity, and to take a view of every thing curious. That day I was so fortunate as to bend my course to an adjacent meadow. My eye happened to catch sight of a plant with which I was unacquainted; I picked up some of its leaves, and put them to my nose: They smelled of garlic. I handed them to my physician, asking him if he knew the plant. After having attentively examined it, he replied that it was the scordium. He lifted up his hands to Heaven, and gave thanks to God for the seasonable relief which He had sent us. He instantly gathered a considerable quantity, put it into a large kettle, and boiled it thoroughly. Then, calling for the patients, desired them to take courage, and, without the loss of a moment, made them drink copiously of the decoction of that plant, with a slight infusion of the earth of Lemnos: He then had them well warmed, and put to bed, desiring them not to go to sleep till they had fallen into a profuse perspiration, with which they exactly complied. The next day they felt themselves greatly relieved. A similar dose was repeated, and the whole ended in a perfect cure. Thus, through the goodness of God, we escaped a death which stared us immediately in the face.” (*Letters of the Baron Buzbecquis*, vol. i. page 197 and 198.)

vegetable kingdom, inasmuch as there is not a single genus of plants, varied into umbelliferous, rose formed, papilionaceous, and the rest, but what presents food to Man, in some part or another of the Globe. The ciperus of Ethiopia bears, at its root, bulbs which have the taste of almonds. That which in Italy is called *Trafì* produces bulbs which taste like chestnuts.* We have found, in America, the potatoe in the class of *solana*, which are poisons. It is a jasmine of Arabia, which supplies us with the coffee berry. The eglantine, with us, produces berries fit only for the use of birds; but that of the Land of Yesso, which grows there among rocks, and the shells on the sea shore, bears cups so large and so nourishing, that they serve for food to the inhabitants of those shores, for a considerable part of the year.† The ferns of our hills are unproductive; but there grows in North America a species of this plant, called *Filix baccifera*, loaded with berries, which are very good to eat.‡ The tree itself of the Molucca Islands, called *Libbi* by the inhabitants, and palm sago by travellers, is, in the judgment of our Botanists, merely a fern. This fern contains in its trunk the sago, a substance lighter, and more delicate than rice. In a word, there are even certain species of sea weed, which the Chinese eat with delight, among others, those which compose the nests of a species of swallow.

By disposing in this order, therefore, the plants which produce the principal subsistence of Man, as the grasses, we should have, first, for our own country; the wheat of strong lands, the rye of the sands, the barley of the rocks, the oats of humid places, the buck wheat of rainy declivities; and for other climates and exposures, the pannic, the millet, the maize, the Canadian oats, the rice of Asia,

* See the Catalogue of Garden Plants of Boulogne, by *Hyacinth Ambrosino*.

† Consult Collection of Voyages by *Thevenot*.

‡ See Father *Charlevoix*, his History of New France.

some species of which thrive in dry situations; and so of the rest.

It would be farther useful to ascertain on the Globe the places to which the several origin of each alimentary plant might be referred. What I have to advance on this subject may be conjecture merely, but it appears to me to have an air of probability. I am of opinion, then, that Nature has placed in islands the species of plants which are most beautiful, and best adapted to the necessities of Man. First, islands are more favourable to the elementary expansions of plants, than the interior of continents, for there is no one but what enjoys the influences of all the elements, being completely furrounded by the winds and the seas, and frequently in its interior, possessing the combined advantages of plains, of sands, of lakes, of rocks and of mountains. An island is a little world in epitome. Secondly, their particular temperature is so varied, that you find of them in all the principal points of Longitude and Latitude, though there be a considerable number still unknown to us, particularly in the South Seas. Finally, experience demonstrates, that there is not a single fruit tree in Europe, but what becomes more beautiful in some of the islands along its coasts, than in the Continent.

I have spoken of the beauty of the chestnut trees of Corsica and Sicily: But *Pliny*, who has preserved to us the origin of the fruit trees which were in Italy in his time, informs us, that most of them had been imported from the islands of the Archipelago. The walnut came from Sardinia; the vine, the fig tree, the olive, and many other fruit trees, were natives of the other islands of the Mediterranean. Nay, he observes, that the olive tree, as well as several other plants, thrives only in the vicinity of the Sea. All modern travellers confirm these observations. *Tavernier*, who had so many times traversed the Asiatic Continent, assures us, that no olive trees are to be seen beyond Aleppo. An anonymous English traveller, whom

I have already quoted with approbation, positively asserts, that no where, on the Continent, are there to be found fig trees, vines, mulberries, as well as many other fruit trees, once to be compared, either as to magnitude or fertility, with those of the Archipelago, notwithstanding the carelessness and indolence of the wretched possessors. To these I might add a great many other vegetables, which thrive only in those islands, and which furnish to the commerce of Europe, gums, mannas, and dye stuffs. The apple tree, so common in France, produces no where such fine fruit, and of species so varied, as on the shores of Normandy, under the breath of the sea breeze from the West. I have no doubt that the fruit which was proposed as the prize of beauty had, like *Venus* herself, some favourite isle.

If we carry our remarks even into the Torrid Zone we shall find that it is neither from Asia, nor from Africa, that we obtain the clove, the nutmeg, the cinnamon, the pepper of the best quality; the benzoin, the sandal wood, the sago and many others, but from the Molucca Islands, or from those which are in the same seas. The cocoa tree attains its perfect beauty only in the Maldivia Islands. Nay, there are, in the archipelagos of those Seas, a great number of fruit trees described by *Dampier*, which have not yet been transplanted into the Old Continent; such as the grape tree. The double cocoa is to be found only in the Sechelles Islands. The islands recently discovered in the South Sea, such as that of Taïti, have presented us with trees hitherto unknown, as the bread fruit, and the mulberry tree, the bark of which serves to make cloth. As much may be said of the vegetable productions of the Islands of America relatively to their Continent.

These observations might be extended even to the very birds and quadrupeds, which are more beautiful, and of species more varied, in islands, than any where else. The elephants held in highest estimation in Asia, are those of the Island of Ceylon. The Indians believe them to be

possessed of something divine; nay, more, they allege, that other elephants acknowledge this superiority. One thing is certain, they fetch a higher price all over Asia than any others. In a word, travellers the most worthy of credit, and who have made the most accurate observations, as the English *Dampier*, Father *du Tertre*, and some others, assure us, that there is not a shallow in the seas lying between the Tropics, but what is distinguished by some sort of bird, of crab, of turtle, or of fish, which is no where else to be found, either of species so varied, or in so great abundance. I presume that Nature has thus scattered her choicest benefits over the islands, in order to allure men thither, and to pervade the Earth. These are only conjectures, I grant; but they rarely deceive us when they are founded on the wisdom and goodness of the AUTHOR of Nature.

The finest species of corn, therefore, which is wheat, might be referred to Sicily, where, in fact, they pretend it was originally found. Fable has immortalized this discovery, by making that island the scene of the amours of *Ceres*; as well as the birth of *Bacchus*, in the Isle of *Naxos*, because of the beauty of its vines. This much is certain, that corn is no where indigenous but in Sicily, if, however, it still reperpetuates itself there spontaneously, as the Ancients affirm.

After having determined in the same manner, the other human accommodations of the grasses to different situations of ground, we might examine the grasses which exhibit marked relations to our domestic animals, such as the ox, the horse, the sheep, the dog. We might characterize them by the names of these animals. We should have the *gramen bovinum, equinum, ovinum, caninum*. The different species of each of these genera, might afterwards be distinguished by the names of the different places where they are found by the several animals; on the banks of rivers, among rocks, on sands, on mountains; so that by the addition of the epithets, *fluviatile*,

saxatile, arenosum, montanum, you might supply, in two words, all the verbose phraseology of our botanical compositions.

We might apportion, in like manner, the other grasses, to the different quadrupeds of our forests, as to the stag, to the hare, to the wild boar, and so on. These first determinations would require certain experiments to be made on the tastes of animals, but they would be very instructive, and highly amusing. They would have no mixture of cruelty, as most of those of our modern physics have, by which the wretched animal is flead alive, poisoned, or suffocated, in order to come at the knowledge of its propensities. Our experiments would study their appetites only, and not their convulsions. Besides, there are a great many of those preferred and rejected plants, already well known to our shepherds. One of them shewed me, in the vicinity of Paris, a gramineous plant, which fattens sheep more in a fortnight, than the other species can do in two months. The moment, too, that they perceive it, they run after it with the utmost avidity. Of this I have been an eye witness. I do not mean, however, to assert that each species of animal limits its appetite to a single species of food. It is quite sufficient, in order to establish the order which I am proposing, that each of them gives, in every genus of plant, a decided preference to some one species; and this is confirmed, beyond all doubt, by experience.

The great class of the gramineous plants being thus apportioned to Man and animals, other plants would present still greater facility in their appropriations, because they are much less numerous. Of the fifteen hundred and fifty species of plants, enumerated by *Sebastian le Vaillant* in the country adjacent to Paris, there are more than a hundred families, among which that of the grasses comprehends, for its share, eightyfive species, exclusive of twenty six varieties, and our different sorts of corns. It is the most numerous next to that of mushrooms, which con-

tains a hundred and ten species, and that of mosses, which contains eightyfix. Thus, instead of the systematic classification of botanic Writers, which gives no explanation of the uses of most of the vegetable parts, which frequently confounds plants the most heterogeneous, and separates those of the same genus, we should have an order simple, easy, agreeable, and of an infinite extent, which passing from Man to animals, to vegetables, and to the elements, would discover to us the plants which serve to our use, and to that of other sensible Beings, would render to each of them its elementary relations, to each site on the Earth its vegetable beauty, and would replenish the heart of Man with admiration and gratitude. This plan appears so much the more conformable to that of Nature, that it is entirely comprehended in the benediction which its AUTHOR pronounced upon our first parents, saying unto them :* “ Behold, I have given unto you every
 “ herb bearing seed, which is upon the face of all the
 “ Earth, and every tree, in the which is the fruit of a
 “ tree yielding seed, *after its kind*: To you it shall be for
 “ meat : And to every beast of the Earth, and to every
 “ fowl of the air, and to every thing that creepeth upon
 “ the Earth, wherein there is life, I have given every
 “ green herb for meat.”

This benediction is not confined, as far as Man is concerned, to some primordial species in each genus. It is extended to the whole vegetable kingdom, which converts itself into aliment fit for his use, by means of the domestic animals. *Linnaeus* has presented to them, from the eight to the nine hundred plants which Sweden produces, and he remarked that, of these, the cow eats two hundred and eightyfix ; the goat, four hundred and fiftyeight ; the sheep, four hundred and seventeen ; the horse, two hundred and seventyeight ; the hog, one hundred and seven. The first animal refuses only one hundred and eightyfour

* Genesis, chap. i. ver. 29, 30.

of them; the second, ninety two; the third, one hundred and twelve; the fourth, two hundred and seven; the fifth, one hundred and ninety. In these enumerations he comprehends only the plants which those animals eat with avidity, and those which they obstinately reject. The others are indifferent to them. They eat them when necessity requires, and even with pleasure, when they are tender. Not one of them goes to waste. Those which are rejected by some, are a high delice to others. The most acrid, and even the most venomous, serve to fatten one or another. The goat browses on the ranunculus of the meadow, though hot as pepper, on the tithymal and the hemlock. The hog devours the horsetail and henbane. He did not put the ass to this kind of proof, for that animal does not live in Sweden, nor the rein deer, which supplies the want of him to so much advantage in northern regions, nor the other domestic animals, such as the duck, the goose, the hen, the pigeon, the cat and the dog.

All these animals united, seem destined to convert to our advantage every thing that vegetates, by means of their universal appetites, and especially by that inexplicable instinct of domesticity which attaches them to Man; whereas no art can communicate it either to that timid animal the deer, nor even to some of the smaller birds, which seek to live under our protection, such as the swallow, who builds her nest in our houses. Nature has bestowed this instinct of sociability with Man, only on those whose services might be useful to him at all seasons; and she has given them a configuration wonderfully adapted to the different aspects of the vegetable kingdom.

I say nothing of the camel of the Arabian, which can travel under a load, for several days together, without drinking, in traversing the burning sands of Zara; nor of the rein deer of the Laplander, whose deeply cleft hoof can fasten, and run along, on the surface of the snow; nor of the rhinoceros of the Siamese and of the Peguan, who,

with the folds of his skin, which he can distend at pleasure, is able to disengage himself out of the marshy grounds of Siriam; nor of the Asiatic elephant, whose foot, divided into five ergots, is so sure on the steep mountains of the Torrid Zone; nor of the lama of Peru, who, with his forked feet, scrambles over the rocky heights of the Cordeliers. Every extraordinary situation is maintaining for Man a useful and commodious servant.

But without removing from our own hamlets, the single hoofed horse pastures in the plains, the ponderous cow in the bottom of the valley, the bounding sheep on the declivity of the hill, the scrambling goat on the sides of the rocks; the hog, furnished with a proboscis, rakes up the morafs from the bottom; the goose and the duck feed on the fluviatric plants; the hen picks up every grain that was scattered about, and in danger of being lost in the field; the four winged bee collects a tribute from the small dust of the flowers; and the rapid pigeon hastens to save from loss the grains which the winds had conveyed to inaccessible rocks. All these animals, after having occupied through the day the various sites of vegetation, return in the evening to the habitation of Man, with bleatings, with murmurings, with cries of joy, bringing back to him the delicious produce of the vegetable creation, transformed, by a process altogether inconceivable, into honey, into milk, into butter, into eggs, and into cream.

I take delight in representing to myself those early ages of the World, when men travelled over the face of the Earth, attended by their flocks and herds, laying the whole vegetable kingdom under contribution. The Sun, going before them, in the Spring, invited them to advance to the farthest extremities of the North, and to return with Autumn bringing up his train. His annual course in the Heavens seems to be regulated by the progress of Man over the Earth. While the Orb of Day is advancing from the Tropic of Capricorn to that of Cancer, a traveller departing on foot from the Torrid Zone, may

vegetable kingdom, inasmuch as there is not a single genus of plants, varied into umbelliferous, rose formed, papilionaceous, and the rest, but what presents food to Man, in some part or another of the Globe. The ciperus of Ethiopia bears, at its root, bulbs which have the taste of almonds. That which in Italy is called *Trafi* produces bulbs which taste like chestnuts.* We have found, in America, the potatoe in the class of *solana*, which are poisons. It is a jasmine of Arabia, which supplies us with the coffee berry. The eglantine, with us, produces berries fit only for the use of birds; but that of the Land of Yesso, which grows there among rocks, and the shells on the sea shore, bears cups so large and so nourishing, that they serve for food to the inhabitants of those shores, for a considerable part of the year.† The ferns of our hills are unproductive; but there grows in North America a species of this plant, called *Filix baccifera*, loaded with berries, which are very good to eat.‡ The tree itself of the Molucca Islands, called *Libbi* by the inhabitants, and palm sago by travellers, is, in the judgment of our Botanists, merely a fern. This fern contains in its trunk the sago, a substance lighter, and more delicate than rice. In a word, there are even certain species of sea weed, which the Chinese eat with delight, among others, those which compose the nests of a species of swallow.

By disposing in this order, therefore, the plants which produce the principal subsistence of Man, as the grasses, we should have, first, for our own country; the wheat of strong lands, the rye of the sands, the barley of the rocks, the oats of humid places, the buck wheat of rainy declivities; and for other climates and exposures, the pannic, the millet, the maize, the Canadian oats, the rice of Asia,

* See the Catalogue of Garden Plants of Boulogne, by *Hyacinth Ambrosino*.

† Consult Collection of Voyages by *Thevenot*.

‡ See Father *Charlevoix*, his History of New France.

some species of which thrive in dry situations; and so of the rest.

It would be farther useful to ascertain on the Globe the places to which the several origin of each alimentary plant might be referred. What I have to advance on this subject may be conjecture merely, but it appears to me to have an air of probability. I am of opinion, then, that Nature has placed in islands the species of plants which are most beautiful, and best adapted to the necessities of Man. First, islands are more favourable to the elementary expansions of plants, than the interior of continents, for there is no one but what enjoys the influences of all the elements, being completely surrounded by the winds and the seas, and frequently in its interior, possessing the combined advantages of plains, of sands, of lakes, of rocks and of mountains. An island is a little world in epitome. Secondly, their particular temperature is so varied, that you find of them in all the principal points of Longitude and Latitude, though there be a considerable number still unknown to us, particularly in the South Seas. Finally, experience demonstrates, that there is not a single fruit tree in Europe, but what becomes more beautiful in some of the islands along its coasts, than in the Continent.

I have spoken of the beauty of the chestnut trees of Corfica and Sicily: But *Pliny*, who has preserved to us the origin of the fruit trees which were in Italy in his time, informs us, that most of them had been imported from the islands of the Archipelago. The walnut came from Sardinia; the vine, the fig tree, the olive, and many other fruit trees, were natives of the other islands of the Mediterranean. Nay, he observes, that the olive tree, as well as several other plants, thrives only in the vicinity of the Sea. All modern travellers confirm these observations. *Tavernier*, who had so many times traversed the Asiatic Continent, assures us, that no olive trees are to be seen beyond Aleppo. An anonymous English traveller, whom

I have already quoted with approbation, positively asserts, that no where, on the Continent, are there to be found fig trees, vines, mulberries, as well as many other fruit trees, once to be compared, either as to magnitude or fertility, with those of the Archipelago, notwithstanding the carelessness and indolence of the wretched possessors. To these I might add a great many other vegetables, which thrive only in those islands, and which furnish to the commerce of Europe, gums, mannas, and dye stuffs. The apple tree, so common in France, produces no where such fine fruit, and of species so varied, as on the shores of Normandy, under the breath of the sea breeze from the West. I have no doubt that the fruit which was proposed as the prize of beauty had, like *Venus* herself, some favourite isle.

If we carry our remarks even into the Torrid Zone we shall find that it is neither from Asia, nor from Africa, that we obtain the clove, the nutmeg, the cinnamon, the pepper of the best quality; the benzoin, the sandal wood, the sago and many others, but from the Molucca Islands, or from those which are in the same seas. The cocoa tree attains its perfect beauty only in the Maldivia Islands. Nay, there are, in the archipelagos of those Seas, a great number of fruit trees described by *Dampier*, which have not yet been transplanted into the Old Continent; such as the grape tree. The double cocoa is to be found only in the Sechelles Islands. The islands recently discovered in the South Sea, such as that of Taïti, have presented us with trees hitherto unknown, as the bread fruit, and the mulberry tree, the bark of which serves to make cloth. As much may be said of the vegetable productions of the Islands of America relatively to their Continent.

These observations might be extended even to the very birds and quadrupeds, which are more beautiful, and of species more varied, in islands, than any where else. The elephants held in highest estimation in Asia, are those of the Island of Ceylon. The Indians believe them to be

possessed of something divine; nay, more, they allege, that other elephants acknowledge this superiority. One thing is certain, they fetch a higher price all over Asia than any others. In a word, travellers the most worthy of credit, and who have made the most accurate observations, as the English *Dampier*, Father *du Tertre*, and some others, assure us, that there is not a shallow in the seas lying between the Tropics, but what is distinguished by some sort of bird, of crab, of turtle, or of fish, which is no where else to be found, either of species so varied, or in so great abundance. I presume that Nature has thus scattered her choicest benefits over the islands, in order to allure men thither, and to pervade the Earth. These are only conjectures, I grant; but they rarely deceive us when they are founded on the wisdom and goodness of the AUTHOR of Nature.

The finest species of corn, therefore, which is wheat, might be referred to Sicily, where, in fact, they pretend it was originally found. Fable has immortalized this discovery, by making that island the scene of the amours of *Ceres*; as well as the birth of *Bacchus*, in the Isle of *Naxos*, because of the beauty of its vines. This much is certain, that corn is no where indigenous but in Sicily, if, however, it still reperpetuates itself there spontaneously, as the Ancients affirm.

After having determined in the same manner, the other human accommodations of the grasses to different situations of ground, we might examine the grasses which exhibit marked relations to our domestic animals, such as the ox, the horse, the sheep, the dog. We might characterize them by the names of these animals. We should have the *gramen bovinum, equinum, ovinum, caninum*. The different species of each of these genera, might afterwards be distinguished by the names of the different places where they are found by the several animals; on the banks of rivers, among rocks, on sands, on mountains; so that by the addition of the epithets, *fluviatile,*

saxatile, arenosum, montanum, you might supply, in two words, all the verbose phraseology of our botanical compositions.

We might apportion, in like manner, the other grasses, to the different quadrupeds of our forests, as to the stag, to the hare, to the wild boar, and so on. These first determinations would require certain experiments to be made on the tastes of animals, but they would be very instructive, and highly amusing. They would have no mixture of cruelty, as most of those of our modern physicians have, by which the wretched animal is bleed alive, poisoned, or suffocated, in order to come at the knowledge of its propensities. Our experiments would study their appetites only, and not their convulsions. Besides, there are a great many of those preferred and rejected plants, already well known to our shepherds. One of them shewed me, in the vicinity of Paris, a gramineous plant, which fattens sheep more in a fortnight, than the other species can do in two months. The moment, too, that they perceive it, they run after it with the utmost avidity. Of this I have been an eye witness. I do not mean, however, to assert that each species of animal limits its appetite to a single species of food. It is quite sufficient, in order to establish the order which I am proposing, that each of them gives, in every genus of plant, a decided preference to some one species; and this is confirmed, beyond all doubt, by experience.

The great class of the gramineous plants being thus apportioned to Man and animals, other plants would present still greater facility in their appropriations, because they are much less numerous. Of the fifteen hundred and fifty species of plants, enumerated by *Sebastian le Vaillant* in the country adjacent to Paris, there are more than a hundred families, among which that of the grasses comprehends, for its share, eightyfive species, exclusive of twenty six varieties, and our different sorts of corns. It is the most numerous next to that of mushrooms, which con-

tains a hundred and ten species, and that of mosses, which contains eightyfix. Thus, instead of the systematic classification of botanic Writers, which gives no explanation of the uses of most of the vegetable parts, which frequently confounds plants the most heterogeneous, and separates those of the same genus, we should have an order simple, easy, agreeable, and of an infinite extent, which passing from Man to animals, to vegetables, and to the elements, would discover to us the plants which serve to our use, and to that of other sensible Beings, would render to each of them its elementary relations, to each site on the Earth its vegetable beauty, and would replenish the heart of Man with admiration and gratitude. This plan appears so much the more conformable to that of Nature, that it is entirely comprehended in the benediction which its AUTHOR pronounced upon our first parents, saying unto them :* “ Behold, I have given unto you every
 “ herb bearing seed, which is upon the face of all the
 “ Earth, and every tree, in the which is the fruit of a
 “ tree yielding seed, *after its kind*: To you it shall be for
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I take delight in representing to myself those early ages of the World, when men travelled over the face of the Earth, attended by their flocks and herds, laying the whole vegetable kingdom under contribution. The Sun, going before them, in the Spring, invited them to advance to the farthest extremities of the North, and to return with Autumn bringing up his train. His annual course in the Heavens seems to be regulated by the progress of Man over the Earth. While the Orb of Day is advancing from the Tropic of Capricorn to that of Cancer, a traveller departing on foot from the Torrid Zone, may

arrive on the shores of the Frozen Ocean, and return thence into the Temperate Zone, when the Sun traces backward his progress, at the rate of only four, or, at most, five leagues a day, without being incommoded, the whole journey through, with either the sultry heat of Summer, or the frost of Winter. It is by regulating themselves according to the annual course of the Sun, that certain Tartar hordes still travel.

What a spectacle must the virgin Earth have presented to its first inhabitants, while every thing was as yet in its place, and Nature not yet degraded by the injudicious labours, or the desperate madness of Man ! I suppose them taking their departure from the banks of the Indus, that land which is the cradle of the Human Race, on a progress northward. They first crossed the lofty mountains of Bember, continually covered with snow, which, like a rampart, encompasses the happy land of Cachemire, and separate it from the burning kingdom of Lahor.* They presented themselves to their eyes like vast amphitheatres of verdure, clothed, to the South, with all the vegetables of India, and, to the North, with all those of Europe. They descended into the vast basin which contains them, and there they beheld a part of the fruit trees which were destined one day to enrich our orchards. The apricots of Media, and the peach trees of Persia, skirted, with their blossoming boughs, the lakes, and the brooks of living water which bedew their roots. On leaving the evergreen valleys of Cachemire, they quickly penetrated into the forests of Europe, and went to repose under the foliage of the stately beech and tufted elm, which had as yet shaded only the loves of the feathered race, and which no Poet had hitherto sung. They crossed the boundless meadows which are washed by the Irtis, resembling Oceans of verdure, here and there diversified with long beds of yellow lilies, with stripes of ginzang, and tufts of broad leaved

* Consult *Bernier's Description of the Mogul Country*.

rhubarb. Following the track of its current, they plunged into the forests of the North, under the majestic branches of the fir, and the moving foliage of the birch.

What smiling valleys opened to their view, along the river's side, and invited them to deviate from the road, by promising them objects still more lovely ! What hills enamelled with unknown flowers, and crowned with ancient and venerable trees, endeavoured to persuade them to proceed no farther ! Arrived on the shores of the Icy Sea, a new order of things arose to view. There was now no more night. The Sun encompassed the Horizon round and round ; and the mists, dispersed through the air, repeated, on different planes, the lustre of his rays in rainbows of purple, and parhelions of dazzling radiance. But, if the magnificence of the Heavens was multiplied, desolation covered the face of the Earth. The Ocean was hoary with mountains of floating ice, which appeared in the Horizon like towers and cities in ruin ; and on the land, nothing to be seen, in place of groves, but a wretched shrubby blasted by the winds, and instead of verdant meads, rocks clothed with moss. The flocks which had accompanied them must there undoubtedly have perished ; but even there Nature had still made provision for the necessities of Man. Those shores were composed of massy beds of coal.* The seas swarmed with fishes, and the lakes with fowls. They must find, among the animal tribes, servants and assistants : The reindeer appeared in the middle of the mosses : She presented to those wandering families, the services of the horse in her agility, the fleece of the sheep in her fur ; and shewing them, like the cow, her four teats, and but one nursling, she seemed to tell them that she was destined, like her, to share her milk with mothers oppressed by a too numerous offspring.

But the East must have been the part of the Globe which first attracted the attention of Mankind. That

* Professor *Gmelin's* Journey to Siberia.

place of the Horizon where the Sun arises, undoubtedly fixed their wondering eyes, at a period when no system had interposed to regulate opinion. On seeing that great Luminary arising, from day to day, in the same quarter of the Heavens, they must have been persuaded that he there had a fixed habitation, and that he had another where he set, as a place of rest. Such imaginations, confirmed by the testimony of their eyes, were, it must be admitted, natural to men destitute of experience, who had attempted to erect a tower which should reach to Heaven, and who, even in the illumination of more scientific ages, believed, as a point of religion, that the Sun was drawn about in a chariot by horses, and retired every evening to repose in the arms of *Thetis*. I presume, they would be determined to go in quest of him rather toward the East than toward the West, under the persuasion that they would greatly abridge their labour, by advancing to meet him.

It must have been this conviction, I am disposed to think, which left the West, for a long time, in a deserted state, under the very same Latitudes which, in the East, were swarming with inhabitants, and which first sent men in crowds toward the eastern part of our Continent, where the earliest and most populous Empire of the World, that of China, was formed. What confirms me farther in the belief, that the first men, who advanced toward the East, were engaged in this research, and were in haste to reach their object, is this, that having taken their departure from India, the cradle of the Human Race, like the founders of other Nations, they did not, like them, people the Earth progressively, as Persia, Greece, Italy and Gaul, were successively, in a westerly direction; but leaving desert the vast and fertile countries of Siam, of Cochinchina, and of Tonquin, which are to this day half barbarous and uninhabited, they never gave up the pursuit till they were stopped by the Eastern Ocean; and they gave to the islands which they perceived at a distance, and on which

they did not for a long time, acquire the skill to land, the name of *Gepuen*, which we have transformed into Japan, and which, in the Chinese language, signifies, birth of the Sun.

Father *Kircher* * assures us, that when the first Jesuit Astronomers arrived in China, and there reformed the Calendar, the Chinese believed the Sun and the Moon to be no bigger than they appear to the eye ; that, on setting, they retired to a deep cave, from which they issued next day at the time of rising ; and, finally, that the Earth was a plane and smooth surface. *Tacitus*, who has written History with such profound judgment, does not deem it to be beneath him, in that of Germany, to relate the traditions of the western Nations, who affirmed, that toward the Northwest was the place where the Sun went to bed, and that they could hear the noise which he made on plunging into the waves.

It was from the quarter of the East, then, that the Orb of Day first attracted the curiosity of Mankind. There were, likewise, tribes which directed their course toward that point of the Globe, taking their departure from the southern part of India. These advanced along the peninsula of Malacca ; and, familiarized with the Sea, which they coasted most of the way, they were induced to form the resolution of availing themselves of the united accommodation which the two elements present to travellers, by navigating from island to island. They thus pervaded that vast belt of islands, which Nature has thrown into the Torrid Zone, like a bridge intersected by canals, in order to facilitate the communication of the two Worlds. When retarded by tempests, or contrary winds, they drew their barks ashore, cast a few seeds into the ground, reaped the crop, and deferred their reembarkation till fairer weather, and a season more favourable, encouraged them to venture forth.

* See China illustrated, chap. ix.

Thus it was that the early mariners performed their voyages, and that the Phenicians, employed by *Necho*, King of Egypt, made the circuit of Africa in three years, departing by way of the Red Sea, and returning by the Mediterranean, according to the account given of it by *Herodotus*.*

The first Navigators, when they no longer saw islands in the Horizon, paid attention to the seeds which the Sea cast upon the shore of those where they were, and to the flight of the birds which were withdrawing from it. On the faith of these indications, they directed their course toward lands they had never yet seen. Thus were discovered the immense Archipelego of the Moluccas, the Islands of Guam, of Quiros, of the Society, and, undoubtedly, many others which are still unknown to us. There was not one but what invited them to land, by presenting some attractive accommodation. Some stretched out along the waves like Nereïds, poured from their urns, rills of fresh water into the Sea : It was thus that the Island of Juan Fernandez, with its rocks and cascades, presented itself to Admiral *Anson*, in the midst of the South Sea. Others, on the contrary, in the same Ocean, having their centres sunk, and their extremities elevated, and crowned with cocoa trees, offer to their canoes basons at all seasons tranquil, swarming with fishes and sea fowls : Such is that known by the name of *Woesterland*, or the Land of Water, discovered by the Dutch Navigator *Schouten*. Others, in the morning, appeared to them, in the bosom of the azure main, all over irradiated with the light of the Sun, as that one of the same Archipelago which goes by the name of *Aurora*. Some announce themselves in the darkness of night, by the flames of a volcano, as a pharos blazing aloft amidst the waters, or by the odoriferous emanations of their perfumes.

There was not one of them of which the woods, the hills, and the downs, did not maintain some animal, natur-

* Herodotus, book iv.

ally familiar and gentle, but which becomes savage only from the cruel experience which it acquires of Man. They saw fluttering around them, as they disembarked on their strands, the silken winged birds of paradise, the blue pigeons, the cacatoës all over white, the lauris all over red. Every new island tendered them some new present ; crabs, fishes, shells, pearl oysters, lobsters, turtles, ambergris ; but the most agreeable, beyond all doubt, were the vegetables. Sumatra displayed, on her shores, the pepper plant ; Banda, the nutmeg ; Amboyna, the clove ; Ceram, the palm sago ; Florés, the benzoin and sandal wood ; New Guinea, groves of cocoa trees ; Taïti, the bread fruit. Every island arose in the midst of the Sea, like a vase which supported a precious vegetable. When they discovered a tree laden with unknown fruit, they gathered some branches of it, and ran to meet their companions with shouts of joy, exhibiting to them this new benefit bestowed by Nature.

From those early voyages, and from those ancient customs it is, that there has been diffused, over all Nations, the practice of consulting the flight of birds before engaging in any enterprise, and that of going to meet strangers, with the branch of a tree in the hand, in token of peace, and of joy at sight of a present from Heaven. These customs still exist among the islanders of the South Sea, and among the free tribes of America. But not fruit trees alone fixed the attention of the first Men. If some heroic action, or some irreparable disaster, had excited admiration, or inspired regret, the tree adjoining was ennobled by it. They preferred it, with those fruits of virtue or of love, to such as produced food or perfume. Thus, in the islands of Greece and of Italy, the laurel became the symbol of triumph, and the cypress that of eternal sorrow. The oak supplied crowns of undecaying honour to the well deserving citizen, and simple grasses decorated the brows of the men who had saved their country. O Romans ! people worthy of the Empire of the World, in that you

opened to every one of your subjects the career of virtuous exertion, and culled the most common plants of the field to serve as the badge of immortal glory, that a crown for the head of virtue might be found on every spot of the Globe.

From similar attractions it was, that, from island to island, the Nations of Asia made their way to the New World, where they landed on the shores of Peru. Thither they carried the name of children of that Sun whom they were pursuing. This brilliant chimera emboldened them to attempt the passage to America. It was not dissipated till they reached the shores of the Atlantic Ocean; but it diffused itself over the whole Continent, where most of the Chiefs of the Nations still assume the title of Children of the Sun.*

* I do not mean to affirm, however, that America was peopled only from the islands of the South Sea. I believe that a passage was opened into it, likewise, by the North of Asia and of Europe. Nature always presents to Mankind different means for the attainment of the same end. But the principal population of the New World came from the islands of the South Sea. This I am able to prove by a multitude of monuments still existing, and to the most remarkable of which I shall confine myself. It is demonstrated, then, by the worship of the Sun, established in India, in the islands of the South Sea, and in Peru, as well as by the title of Suns, or Children of the Sun, assumed by many families of those countries; by the traditions of the Caraihs scattered over the Antilles, and in Brasil, who give themselves out as originally from Peru; by the very establishment of that Monarchy of Peru, as well as that of Mexico, situated on the western coast of America, which looks toward the islands of the South Sea, and by the populousness of their Nations, which were much more considerable, and more polished than those which inhabited the eastern coasts, which supposes the former to be of a much higher antiquity; by the prodigious diffusion of the Taitian language, the different dialects of which are spread over most of the islands of the South Sea, and of which words innumerable are to be found in the language of Peru, as has lately been proved by a gentleman of great learning, and even in that of the Malays in Asia, some of which I myself was able to distinguish, particularly the word *maté* which signifies to kill; by the practices common and peculiar to the Nations of the Peninsula of Malacca, of the islands of Asia, of those of the South Sea and of Brasil, which are not the inspiration of Nature, such as that of making fermented and intoxicating liquors, and of chewing herbs and roots; by the channels of the com-

Mankind, encompassed with so many blessings, continues to be wretched. There is not a single genus of animal but what lives in abundance and liberty, the greatest

merchandise of antiquity which flowed in this direction, such as that of gold, which was very common in Arabia and in the Indies, in the time of the Romans, though there be very few mines of that metal in Asia; but above all, by the trade of emeralds, which must have run in that track from remote antiquity, in order to reach the Old Continent, where no mine of that gem is to be found. Hear what is said on this subject by *Tavernier*, who is worthy of credit when he speaks of the commerce of Asia, especially as it relates to jewels. "It is an error of long standing," says he, "which many persons have fallen into, to believe that the emerald was found originally in the East. Most jewellers, on first looking at a high coloured emerald, are accustomed to say, this is an Oriental emerald. But they are mistaken, for I am well assured, that the East never produced one, either on the Continent, or in its islands. I have made accurate enquiries into this, in all the voyages I made." He had travelled six times by land through India. Hence it must be concluded, that the so highly valued emeralds of the ancients, came to them from America, through the islands of the South Sea, through those of Asia, through India, the Red Sea, and, finally, through Egypt, from whence they had them.

To this may be objected the difficulty of navigating against the regular easterly winds, in order to pass from Asia to America, under the Torrid Zone; but, relatively to this subject, I shall repeat, that the regular winds do not blow there from the East, but from the Northeast and Southeast, and depend so much the more on the two Poles, the nearer you approach toward the Line. This oblique direction of the wind was sufficient for persons who navigated from island to island, and who had contrived barks the least liable to deflection, such as the double proas of the Isles of Guam, the form of which seems to have been preserved in the double barks of the coast of Peru. *Schouten* found one of those double proas sailing more than six hundred leagues from the Island of Guam toward America. Besides, it appears, likewise, that the South Sea has its monsoons, which have not hitherto been observed. Hear the remarks made, on the variation of those winds, by an anonymous English Navigator, who sailed round the World, with Sir *Joseph Banks* and Mr. *Solander*, in the years 1768, 1769, 1770 [and 1771, page 83. "The inhabitants of Otaheite, trade with those of the adjacent islands which lie to the eastward, and which we had discovered on our passage. During three months of the year, the winds which blow from the *West quarter* are very favourable to them for carrying on this traffic." Admiral *Anson* likewise met with winds from the West, in those Latitudes, which retarded him.

Certain Philosophers explain the correspondencies to be found between the inhabitants of the islands and those of Continents, by supposing islands

part without labour, all at peace with their species, all united to the objects of their choice, and enjoying the felicity of re-perpetuating themselves by their families; whereas more than the half of Mankind is doomed to celibacy. The other half curses the bands which have matched him. The greater part tremble at the thought of rearing a progeny, under the apprehension of being incapable to find subsistence for them. The greater part, in order to procure subsistence for themselves, are subjected to painful labours, and reduced to the condition of slaves to

to be lands once united to the Continent, but now swallowed up by the Ocean, the summit only, and a few of the inhabitants upon it, remaining above the water. But enough has been already said in this Work, to evince that maritime islands are not fragments separated from the Continent, and that they have mountains, peaks, lakes, hills, proportionable to their extent, and directed to the regular winds which blow over their seas. They have vegetables peculiar to themselves, and which no where else attain the same degree of beauty. Farther, had those islands formerly constituted part of our Continent, we should find in them all those of our quadrupeds which are to be met with in all climates; there were no rats nor mice in America, and in the Antilles, previous to the arrival of the Europeans, if we may believe the testimony of the Spanish Historian *Herrera*, and of Father *du Tertre*. We should, likewise, have found in them the ox, the ass, the camel, the horse, but they contained none of these animals; but plenty of our common poultry, ducks, dogs, swine, as well as among the Islanders of the South Sea, who themselves had no other of our domestic animals. It is obvious that the first animals, such as the horse and the cow, being of a bulk and weight too considerable, could not possibly, be their utility ever so great, cross the seas in the small canoes of the early Navigators, who, on the other hand, would have been very careful not to transport with them such vermin as rats and mice.

Finally, let us revert to the general Laws of Nature. If all the islands of the South Sea once formed a Continent, there must have been no sea, then, in the space which they occupy. Now, it is indubitably certain, that were you, at this day, to take away from around them, the Ocean by which they are encompassed, and the regular winds which blow over it, you would blast them with sterility. The islands of the South Sea form, between Asia and America, a real bridge of communication, with a few arches alone of which we are acquainted, and of which it would not be difficult to discover the rest, from the other harmonies of the Globe. But here I restrain my conjectures on this subject. I have said enough to prove, that the same hand which has covered the Earth with plants and animals for the service of Man, has not neglected the different parts of his habitation.

to their fellow creatures. Whole Nations are exposed to perish by famine : Others, destitute of territory, are piled a top of each other, while the greatest part of the Globe is a wilderness.

There are many lands which never have been cultivated ; but there is not one, known to Europeans, which has not been polluted with human blood. The very solitudes of the Ocean gulp down into their abysses, vessels filled with men, sunk to the bottom by the hands of men. In cities, to all appearance so flourishing by their arts and their monuments, pride and craft, superstition and impiety, violence and perfidy, are in a state of incessant warfare, and keep the wretched inhabitants in perpetual alarm. The more that society is polished in them, the more numerous and cruel are the evils which oppress them. Is the industry of Man there exerted, only because he is there most miserable ? Why should the Empire of the Globe have been conferred on the single animal which had not the government of its own passions ? How comes it that Man, feeble and transitory, should be animated by passions at once ferocious and generous, despicable and immortal ? How is it that, born without instinct, he should have been able to acquire such various knowledge ? He has happily imitated all the arts of Nature, except that of being happy. All the traditions of the Human Race have preserved the origin of these strange contradictions ; but Religion alone unfolds to us the cause of them. She informs us that Man is of a different order from the rest of animals ; that his reason perverted has given offence to the AUTHOR of the Universe ; that as a just punishment, he has been left to the direction of his own understanding ; that he is capable of forming his reason only by the study of universal reason, displayed in the Works of Nature, and in the hopes which virtue inspires ; that by such means alone he can be enabled to rise above the animal, beneath the level of which he is sunk, and to reascend,

step by step, along the steepy declivity of the celestial mountain from which he has been precipitated.

Happy is he, in these days, who, instead of rambling over the World, can live remote from Mankind ! Happy the man who knows nothing beyond the circumference of his own Horizon, and to whom even the next village is an unknown land ! He has not placed his affections on objects which he must never more behold, nor left his reputation at the mercy of the wicked. He believes that innocence resides in hamlets, honour in palaces, and virtue in temples. His glory and his religion consist in communicating happiness to those around him. If he beholds not in his garden the fruits of Asia, or the shady groves of America, he cultivates the plants which delight his wife and children. He has no need of the monuments of Architecture to dignify and embellish his landscape. A tree, under the shade of which a virtuous man is reclined to rest, suggests to him sublime recollections ; the poplar in the forest recalls to his mind the combats of *Hercules* ; and the foliage of the oak reminds him of the crowning garlands of the Capitol.

STUDY ELEVENTH.

OF SOME MORAL LAWS OF NATURE.

*Weakness of Reason, of Feeling; Proofs of the Divinity
and of the Immortality of the Soul from feeling.*

SUCH are the physical proofs of the existence of the DEITY, as far as the feebleness of my reason has enabled me to produce and arrange them. I have collected, perhaps, ten times as many; but I perceived that I was, after all, but at the beginning of my career; that the farther I advanced, the farther it extended itself before me; that my own labour would soon overwhelm me; and that, conformably to the idea of Scripture, nothing would remain to me, after a complete survey of the Works of Creation, but the most profound astonishment.

It is one of the great calamities of human life, that in proportion as we approach the source of truth, it flies away from before us; and that when, by chance, we are able to catch some of its smaller ramifications, we are unable to remain constantly attached to them. Wherefore has the sentiment which yesterday exalted me to Heaven, at sight of a new relation of Nature—wherefore has it disappeared to day? *Archimedes* did not remain always in an ecstasy, from the discovery of the relations of metals in

the crown of King *Hiero*. He after that made other discoveries more congenial to his mind: Such as that of the cylinder circumscribed within the sphere, which he gave directions to have engraved on his tomb. *Pythagoras* contemplated, at length, with indifference, the square of the hypothenufe, for the discovery of which he had vowed, it is said, a whole hecatomb of oxen to *Jupiter*. I recollect that when I first became master of the demonstration of those sublime truths, I experienced a delight almost as lively as that of the great men who were the first inventors of them. Wherefore is it extinguished? Why do I this day stand in need of novelties to procure me pleasure? The mere animal is, in this respect, happier than we are: What pleased him yesterday will likewise give him pleasure tomorrow: He fixes for himself a boundary, which he never exceeds; what is sufficient for him, always appears to him beautiful and good. The ingenious bee constructs commodious cells, but never dreams of rearing triumphal arches, or obelisks, to decorate her waxen city. A cottage was in like manner sufficient for Man, in order to be as well lodged as a bee. What need had he of five orders of Architecture, of pyramids, of towers, of kiosques?

What, then, is that versatile faculty, called *reason*, which I employ in observing Nature? It is, say the Schools, a perception of correspondencies, which essentially distinguishes Man from the beast; Man enjoys reason, and the beast is governed merely by instinct. But if this instinct always points out to the animal what is best adapted to it, it is, therefore, likewise a reason, and a reason more precious than ours, in as much as it is invariable, and is acquired without the aid of long and painful experience. To this, the Philosophers of the last age replied, that the proof of the want of reason in beasts is this, that they act always in the same manner; thus they concluded, from the very perfection of their reason, that they had none. Hence we may see to what a degree great

names, salaries, and associations, may give currency to the greatest absurdities ; for the argument of those Philosophers is a direct attack on the Supreme Intelligence itself, which is invariable in its plans, as animals are in their instinct. If bees uniformly construct their cells of the same figure, it is because Nature always makes bees of the same form.

I do not mean, however, to affirm, that the reason of beasts and that of Man is the same : Ours is, without dispute, much more extensive than the instinct of each animal in particular ; but if Man is endowed with an universal reason, must it not be because his wants are universal ? He likewise discerns, it is true, the wants of other animals ; but may it not be relatively to himself that he has made this his study ? If the dog gives himself no concern about the oats of the horse, it is, perhaps, because the horse is not subservient to the wants of the dog.

We possess, notwithstanding, natural adaptations peculiar to ourselves, such as the art of agriculture, and the use of fire. The knowledge of these, undoubtedly, would demonstrate our natural superiority, were it not, at the same time, a proof of our wretchedness. Animals are under no necessity to kindle fires, and to cast seed into the ground, as they are clothed and fed by the hand of Nature ; besides, many of them have, in themselves, faculties far superior to our sciences, which are, if the truth were told, foreign to us. If we have discovered some phosphoric substances, the luminous fly of the Tropics has in itself a focus of light, which illuminates it during the night. While we are amusing ourselves in making experiments on electricity, the torpedo is employing it in self defence : And while the Academies and States of Europe are proposing considerable prizes to the person who shall discover the means of determining the Longitude at Sea, the pailleur and the frigate are every day performing a flight of three or four hundred leagues between the Tropics, from East to West, without ever failing to find,

in the evening, the rock from which they took their departure in the morning.

Another mortifying insufficiency presents itself, when Philosophy attempts to employ, in combating the intelligence of Nature, that very reason which can be of no use but to discern it. What plausible arguments, respecting the danger of the passions, the frivolity of human life, the loss of fortune, of honour, of children ! You can easily unhouse me, divine *Marcus Aurelius*, and you too, sceptical *Montagne* ; but you have not provided for me another home. You put the staff of Philosophy into my hand, and say to me, walk on intrepidly ; make the tour of the World, begging your bread ; you are just as happy as we in our villas, with our wives, and respected by all around. But here is an evil of which you had no foresight. I have received, in my country, calumny only, as the reward of all my services ; I have experienced nothing but ingratitude on the part of my friends, and even of my patrons ; I am solitary, and have no longer the means of subsistence ; I am a prey to nervous disorders ; I stand in need of men, but my soul is troubled at the sight of them, while I reflect on the fatal reasons by which they are united, and that there is no possibility of interesting them, but by flattering their passions, and by becoming vicious as they are. What good purpose does it serve to have studied virtue ? It shudders at such recollections, and even without any reflection, merely at the sight of men. The first thing that fails me is that very reason, on which you desire me to lean for support. All your fine logicks vanish, precisely at the moment when I have most need of them. Put a reed into the hand of a sick person : The very first thing that will drop from him, when attacked by a fit of illness, is that same reed ; and if he ventures to rest his whole weight upon it, most probably it will break, and, perhaps run through his hand. Death, you tell me, will cure every thing ; but in order to die, I have no occasion for all this reasoning ; besides I do not drop, with the

vigor of life, into the arms of death, but dying and reasoning no longer, still, however, feeling and suffering.*

What is, once more, that reason, of which we boast so triumphantly? As it is nothing more than the relation of objects to our wants, it is reduced, then, to mere personal interest. Hence it is that we have so many family reasons, reasons of associations, reasons of state, reasons of all countries, and of all ages: Hence it is, that the reason of a young man is one thing, and that of an old man another; that the reason of a woman differs from that of a hermit, and a soldier's from a priest's. Every body, says the Duke *de la Rochefoucault*, has reason (is in the right.) Yes, undoubtedly, and it is because every one has reason, that no one agrees with another.

* Thus, Religion has greatly the superiority over Philosophy, in as much as it supports us, not by our reason, but by our resignation. She would have us, not on foot, and stirring about, but stretched on a bed of languishing: Not on the theatre of the World, but reposing at the foot-stool of the Throne of God; not tormented with solicitude about futurity, but confident and composed. When books, honours, fortune and friends forsake us, she presents us, as a pillow for our head, not the recollection of our frivolous and theatrical virtues, but that of our insufficiency; and instead of the arrogant maxims of Philosophy, she demands of us only calmness, peace and filial confidence.

I must make one reflection more respecting this reason, or, which amounts to the same thing, respecting this ingenuity of which we are so vain: Namely this, that it appears to be the result of our miseries. It is very remarkable, that the Nations which have been most celebrated for their wit, their arts and their industry, were the most miserable on the face of the Earth, from their government, their passions, or their discords. Read the history of the lives of most men who have been distinguished by the superiority of their intellectual powers, and you will find that they were extremely miserable, especially in their childhood. One eyed persons, the lame, the hump backed have, in general, more wit than other men, because, from being more disagreeably conformed, they apply their reasoning powers toward observing with more attention the relations of Society, in the view of screening themselves against its oppression. Their humour, it is true, is commonly of the sarcastic kind, but this character is sufficiently applicable to what passes in the World for wit. Besides, it was not Nature which rendered them malignant, but the raillery, or the contempt, of those with whom they have lived.

This sublime faculty farther undergoes, from the first moments of its expansion, a shock so violent, that it is rendered, in some sort, incapable of penetrating into the field of Nature. I do not speak of our methods and systems, which diffuse false lights over the first principles of human knowledge, by shewing us truth only in books, involved in machinery, and displayed on theatres. I have said something of those obstacles, in the objections which I have ventured to propose against the elements of our Sciences; but the maxims instilled into us from our earliest infancy, *make a fortune, be the first*, are alone sufficient to subvert our natural reason; they exhibit to us the just and the unjust, only as they stand related to our personal interests, and to our ambition; they usually attach us to the fortune of some powerful and reputable corps, and render us, as it may happen, atheists or devotees, debauched or continent, Cartesians or Newtonians, just as it affects the cause which has become our only moving principle.

Good cause, then, we have to mistrust reason, as, from the very first step, it misleads us in our researches after truth and happiness. Let us enquire, whether there is not in man some faculty more noble, more invariable, and of greater extent. Though, in prosecuting this enquiry, I have to present only views vague and indeterminate, I hope that men more enlightened than I can pretend to be, may one day fix them, and carry them much farther. In this confidence, with the feeble powers which I possess, I am going to engage in a career, well worthy of the Reader's most serious attention.

Descartes lays this down as the basis of the first natural truths: *I think, therefore I exist*. As this Philosopher has acquired a very high degree of reputation, which he merited, besides, by his knowledge in Geometry, and above all, by his virtues, his argument in proof of existence has been greatly extolled, and dignified with the title of axiom. But, if I am not mistaken, this argument labours

under an essential defect, in that it has not the generality of a fundamental principle ; for it implicitly follows, that when a man does not think, he ceases to exist, or, at least, to have a proof of his existence. It follows farther, that the animal creation, to which *Descartes* denied the power of thought, had no proof that they existed ; and that the greatest part of beings are in a state of nonexistence with respect to us, in as much as they excite in us simple sensations merely, of forms, of colours, and of movements, without any reference to thought. Besides, the results of human thought having been frequently employed, from their versatility, to suggest doubts respecting the existence of GOD, and even of our own, as was the case with the sceptic *Pyrrho* ; this reasoning, like all the operations of the human understanding, falls under well grounded suspicion.

I substitute, therefore, in place of the argument of *Descartes*, that which follows, as it appears to me both more simple and more general : *I feel, therefore I exist*. It extends to all our physical sensations, which admonish us much more frequently of our existence than thought does. It has for its moving principle an unknown faculty of the soul, which I call *sentiment*, or mental feeling, to which thought itself must refer ; for the evidence to which we attempt to subject all the operations of our reason, is itself simply sentiment.

I shall first, make it appear, that this mysterious faculty differs essentially from physical sensations, and from the relations presented to us by reason, and that it blends itself in a manner constant and invariable in every thing that we do ; so that it is, if I may be allowed the expression, human instinct.

As to the difference of sentiment from physical sensation, it is evident, that *Iphigenia* at the altar gives us an impression of a very different nature from that produced by the taste of a fruit, or by the perfume of a flower ; and as to that which distinguishes it from a process of the un-

derstanding, it is certain that the tears and the despair of *Clytemnestra* excite in us emotions of a very different kind from those suggested by a satyr, a comedy, or even, if you will, by a mathematical demonstration.

Not but that reason may sometimes issue in sentiment, when it presents itself with evidence ; but the one is only, with relation to the other, what the eye is with relation to the body, that is, an intellectual vision : Besides, mental feeling appears to me to be the result of Laws of Nature, as reason is the result of political Laws.

I shall give no farther definition of this obscure principle, but I shall render it sufficiently intelligible, if I am so happy as to make it felt. And here I flatter myself with success, by first stating an opposition between it and reason. It is very remarkable that women, who are always nearer to Nature, from their very irregularities, than men with their pretended wisdom, never confound these two faculties, and distinguish the first by the name of sensibility, or sentiment, by way of excellence, because it is, in truth, the source of our most delicious affections. They are continually on their guard against confounding, as most men do, the understanding and the heart, reason and sentiment. The one, as we have seen, is frequently our work ; the other is always the work of Nature. They differ so essentially from each other, that if you wish to annihilate the interest of a Work which abounds in sentiment, you have only to introduce an infusion of reasoning.

This is a fault which the most celebrated Writers have committed, in all the ages in which Society completes its separation from Nature. Reason produces many men of intelligence in ages pretendedly polished ; and sentiment, men of genius, in ages pretendedly barbarous. Reason varies from age to age, and sentiment is always the same. The errors of reason are local and changeable, but the truths of sentiment are invariable and universal. Reason makes the I Greek, the I Englishman, the I Turk ; and sentiment, the I Man, and the I Divine. We stand in need, at this day, of commentaries, in order to understand

the books of antiquity, which are the works of reason, such as those of most Historians, and Poets, satyrical and comic, as *Martial*, *Plautus*, *Juvenal*, and even those of the past age, as *Boileau* and *Moliere*; but none will ever be necessary, in order to be moved by the supplications of *Priam* at the feet of *Achilles*, by the despair of *Dido*, by the tragedies of *Racine*, and the lively fables of *La Fontaine*. We frequently stand in need of many combinations, for the purpose of bringing to light some concealed reason of Nature; but the simple and pure sentiments of repose, of peace, of gentle melancholy, which she inspires, come to us without effort.

Reason, I grant, procures for us pleasures of a certain kind; but if she discovers to us some small portion of the order of the Universe, she exhibits to us, at the same time, our own destruction, attached to the Laws of its preservation; she presents to us, at once, the evils which are past, and those which are to come; she furnishes arms to our passions, at the very time when she is demonstrating to us their insufficiency. The farther that she carries us, the more are the proofs which she accumulates, when we come back to ourselves, of our own nothingness; and, so far from soothing our pains by her researches, she frequently aggravates them bitterly by the discoveries which she makes. Sentiment, on the contrary, blind in its desires, embraces the monuments of all countries, and of all ages; it is soothed to a delicious complacency, in the midst of ruins, of combats, and of death itself, in contemplating an undescribable eternal existence; it pursues, in all its appetites, the attributes of Deity, infinity, extension, duration, power, grandeur and glory; it mingles the ardent desires of these with all our passions; it thus communicates to them a certain sublime impulse; and, by subduing our reason, itself becomes the most noble, and the most delicious instinct of human life.

Sentiment demonstrates to us, much better than reason, the spirituality of the soul; for reason frequently pro-

poses to us, as an end, the gratification of our grossest passions,* whereas sentiment is ever pure in its propensities. Besides, a great many natural effects which escape the one, are under the control of the other; such is, as has been observed, evidence itself, which is merely a matter of feeling, and over which reflection exercises no constraint; such, too, is our own existence. The proof of it is not in the province of reason; for, Why is it that I exist? Where is the reason of it? But I feel that I exist, and this sentiment is sufficient to produce conviction.

This being laid down, I proceed to demonstrate, that there are two powers† in Man, the one animal, and the

* Listen to the voice of reason, is the incessant admonition of our moral Philosophers. But do they not perceive that they are putting us into the hand of our greatest enemy? Has not every passion a reason at command?

† It is from want of attention to those two powers, that so many celebrated performances, on the subject of Man, present a false colouring. Their Authors sometimes represent him to us as a metaphysical object. You would be tempted to think that the physical wants, which stagger even the Saints, are only feeble accessories of human life. They compose it merely of monads, of abstractions, and of moralities. Others discern nothing in man but an animal, and distinguish in him only the coarsest grossness of sense. They never study him without the dissecting knife in their hand, and when he is dead, that is to say, when he is man no longer. Others know him only as a political individual: They perceive him only through the medium of the correspondencies of ambition. It is not Man that interests them; it is a Frenchman, an Englishman, a Prelate, a Gentleman. *Homer* is the only Writer, with whom I am acquainted, who has painted Man complete: All others, the best not excepted, present nothing but a skeleton of him. The *Iliad* of *Homer*, if I may be allowed to judge, is the painting of every Man, as it is that of all Nature. All the passions are there, with their contrasts and their shades, the most intellectually refined, and the most sensually gross. *Achilles* sings the praises of the Gods to the sound of his lyre, and tends the cookery of a leg of mutton in a kettle. This last trait has given grievous offence to our theatrical writers, who deal in the composition of artificial heroes, namely, such as disguise and conceal their first wants, as their authors themselves disguise their own to Society. All the passions of the human breast are to be found in the *Iliad*: Furious wrath in *Achilles*, haughty ambition in *Agamemnon*, patriotic valour in *Hector*; in *Nestor*, unimpassioned wisdom; in *Ulysses*, crafty prudence; calumny in *Thersites*; voluptuousness in *Paris*; faithless love in *Helen*; conjugal love in *Andromache*; paternal affection in *Priam*; friendship in *Patro-*

other intellectual, both of an opposite nature, and which, by their union, constitute human life; just as the harmony of every thing on the Earth is composed of two contraries.

clus; and so on: And besides all this, a multitude of intermediate shades of all these passions, such as the inconsiderate courage of *Diomedes*, and that of *Ajax*, who dared to challenge the Gods themselves to the combat: Then the oppositions of situation and of fortune which detach those characters; such as a wedding, and a country festival, depicted on the formidable buckler of *Achilles*; the remorse of *Helen*, and the restless solicitude of *Andromache*; the flight of *Hector*, on the point of perishing under the walls of his native city, in the sight of his people whose only defender he was; and the peaceful objects presented to him at that tremendous moment, such as the grove of trees, and the fountain to which the Trojan young women were accustomed to resort, to wash their robes, and where they loved to assemble in happier days.

This divine Genius, having appropriated to his heroes a leading passion of the human heart, and having put it in action in the most remarkable phases of human life, has allotted, in like manner, the attributes of God to a variety of Divinities, and has assigned to them the different kingdoms of Nature; to *Neptune*, the Ocean; to *Pluto*, the infernal regions; to *Juno*, the air; to *Vulcan*, the fire; to *Diana*, the forests; to *Pan*, the flocks; in a word, the Nymphs, the Naiads, nay, the very Hours, have all a certain department on the Earth. There is not a single flower but what is committed to the superintendence of some Deity. It is thus that he has contrived to render the habitation of Man celestial. His Work is the most sublime of Encyclopedias. All the characters of it are so exactly in the human heart, and in Nature, that the names by which he has designed them have become immortal. Add to the majesty of his plans a truth of expression, which is not to be ascribed alone to the beauty of his language, as certain Grammarians pretend, but to the vast extent of his observation of Nature. It is thus, for example, that he calls the Sea *impurpled*, at the moment that the Sun is setting; because that then the reflexes of the Sun in the Horizon render it of that colour, as I myself have frequently remarked. *Virgil*, who has imitated him closely, abounds in these beauties of observation, to which Commentators pay very little, if any, attention. In the *Georgics*, for instance, *Virgil* gives to the Spring the epithet of *blushing*; *vere rubenti*, says he. As his translators and commentators have taken no pains to convey this, any more than a multitude of similar touches, I was long impressed with the belief that this epithet was introduced merely to fill up the measure of the verse: But having remarked that, early in the Spring, the shoots and buds of most trees assumed a ruddy appearance, previously to throwing out their leaves, I thence was enabled to comprehend what was the precise moment of the season which the Poet intended to describe by *vere rubenti*.

Certain Philosophers have taken pleasure in painting Man as a God. His attitude, they tell us, is that of command. But, in order to his having the air of command, it is necessary that other men should have that of submission, without which he would find an enemy in every one of his equals. The natural empire of Man extends only to animals; and in the wars which he wages with them, or in the care which he exercises over them, he is frequently constrained to drop his attitude of emperor, and to assume that of a slave.

Others represent Man as the perpetual object of vengeance to angry Heaven, and have accumulated on his existence, all the miseries which can render it odious to him. This is not painting Man. He is not formed of a simple nature, like other animals, each species of which invariably preserves its proper character; but of two opposite natures, each of which is itself farther subdivided into several passions, which form a contrast. In virtue of one of these natures, he unites, in himself, all the wants, and all the passions of animals; and in virtue of the other, the ineffable sentiments of the Deity. It is to this last instinct, much more than to his reflective powers, that he is indebted for the conviction which he has of the existence of GOD; for I suppose, that having, by means of his reason, the faculty of perceiving the correspondencies which exist between the objects of Nature, he found out the relations which subsist between an island and a tree, a tree and a fruit, a fruit and his own wants; he would readily feel himself determined, on seeing an island, to look for food upon it: But his reason, in shewing him the links of four natural harmonies, would not refer the cause of them to an invisible Author, unless he had the sentiment of it deeply impressed on his heart. It would stop short at the point where his perceptions stopped, and where those of animals terminate. A wolf which should swim over a river, in order to reach an island on which he perceived grass growing, in the hope of there finding

sheep likewise, has an equal conception of the links which connect the four natural relations of the island, the grass, the sheep, and his own appetite : But he falls not down prostrate before the intelligent Being who has established them.

Considering Man as an animal, I know of no one to be compared with him in respect of wretchedness. First of all, he is naked, exposed to insects, to the wind, to the rain, to the heat, to the cold and laid under the necessity, in all countries, of finding himself clothing. If his skin acquires, in time, sufficient hardness to resist the attacks of the elements, it is not till after cruel experiments, which sometimes slay him from top to toe. He knows nothing naturally, as other animals do. If he wants to cross a river, he must first learn to swim ; nay, he must, in his infancy, be taught to walk and to speak.* There is no country so happily situated, in which he is not obliged to prepare his food with considerable care and trouble. The banana and the bread fruit tree give him between the Tropics, provisions all the year round ; but then he must plant those trees, he must enclose them within thorny fences, to preserve them from the beasts ; he must dry part of the fruits, for a supply during the hurricane season ; and must build repositories in which to lay them up. Besides, those useful vegetables are reserved for certain privileged islands alone ; for over the rest of the Earth, the culture of alimentary grains and roots requires a great multitude of arts and preparations. Suppose him to have collected around him every blessing his heart can desire, the love and the pleasure which flow from abundance, avarice, thieves, the incursions of the enemy, disturb his enjoyment. He must have laws, judges, magazines, fortresses, confederacies and regiments ; to protect from without, and from within, his ill fated cornfield. Finally,

* The very name of infant is derived from the Latin word *infans*, that is to say one who cannot speak.

when it is in his power to enjoy with all the tranquillity of a sage, languor takes possession of his mind ; he must have comedies, balls, masquerades, amusements to prevent him from reasoning with himself.

It is impossible to conceive how a Nation could exist with the animal passions simply. The sentiments of natural justice, which are the basis of legislation, are not the results of our mutual wants, as has been by some pretended. Our passions are not retrogressive ; they have ourselves alone for their centre. A family of savages, living in the midst of plenty, would be no more concerned about the misery of their neighbours perishing for want, than we concern ourselves at Paris, that our sugar and coffee are costing Africa rivers of tears.

Reason itself, united to the passions, would only stimulate their ferocity ; for it would supply them with new arguments, long after their desires were gratified. It is, in most men, nothing more than the relation between beings and their wants, that is, their personal interest. Let us examine the effect of it, combined with love and ambition, the two tyrants of human life.

Let us first suppose a state entirely governed by Love, such as that on the banks of the Lignon, imagined by the ingenious *d'Urfeius*. I beg leave to ask, Who would be at the trouble of building houses there, and of labouring the ground ? Must we not suppose, that such a country would contain servants, whose industry should compensate the idleness of their masters ? Will not these servants be reduced to the necessity of abstaining from making love, in order that their masters may be incessantly employed in it ? Besides, In what manner are the old people of both sexes to pass their time ? A fine spectacle for them truly, to behold their children always indulging in the dalliance of the tender passion ! Would not such a spectacle become to them a perpetual source of regret, of ill humour, of jealousy, as it is among those of our own country ? Such a government, in truth, were it even in the islands of the

South Sea, under the groves of the cocoa and bread fruit trees, where there was nothing to do but to eat and make love, would soon be torn with discord, and oppressed with languor.

But, on the supposition that the principle of *social reason* were to oblige every family to labour each for its own support, and to introduce more variety into their way of living, by inviting to it our arts and sciences ; it would quickly accelerate their destruction. We must by no means depend on ever hearing there any of those affecting dialogues which *d'Urfeius* puts into the mouth of *Astræa* and *Celadon* ; they are dictated neither by animal love, nor by enlightened reason. Both of these employ a very different logic. When a lover, illuminated there with the science which he had borrowed of us, wished to inspire his mistress with a mutual passion, if, however, it were needful to employ discourse in order to accomplish this, he would talk to her of springs, of masses, of attractions, of fermentations, of the electric spark, and of the other physical causes which determine, according to our modern systems, the propensities of the two sexes, and the movements of the passions. *Political reasons* would interpose, and affix the seal to their union, by stipulating, in the melancholy and mercenary language of our contracts, for dowries, maintenances, redemptions, pin monies, post obits. But the *personal reason* of each contracting party would quickly separate them. As soon as a man saw his wife overtaken with disease, he would say to her : “ My temperament calls for a wife who enjoys health, “ and constrains me to abandon you.” She would answer him, undoubtedly, in order to preserve consistency : “ You do well to obey the dictates of Nature. I “ should, in like manner, have looked out for another “ husband, had you been in my place.” A son would say to his aged and declining father : “ You begot me for “ your pleasure, it is time that I should live for mine.” Where should we find citizens disposed to unite for main-

taining the laws of such a Society ; the soldiers disposed to meet death in defence of it, and the magistrate who would undertake to govern it ? I say nothing of an infinite number of other disorders, which follow in the train of that blind and headstrong passion, even when directed by cool and dispassionate reason.

If, on the other hand, a Nation were under the dominion of ambition solely, it would come still sooner to destruction ; either from external enemies, or by means of its own citizens. It is, first, difficult to imagine how it could be reduced to form, under the authority of one Legislator ; for, How can we conceive the possibility of ambitious men voluntarily submitting to another man ? Those who have united them, as *Romulus*, *Mahomet*, and all founders of Nations, have commanded attention and obedience only by speaking in the name of the DEITY. But supposing this union, by whatever means, accomplished, Could such an association ever be happy ? Let Historians extol conquering Rome ever so highly, Is it credible that her citizens then deserved the appellation of fortunate ? While they were spreading terror over the Globe, and causing floods of tears to flow, Were there at Rome no hearts oppressed with terror, and no eye overflowing, for the loss of a son, of a father, of a husband, of a lover ? Were the slaves, who constituted by far the greatest part of her inhabitants, were they happy ? Was the General of the Roman army himself happy, crowned with laurels as he was, and mounted on a triumphal car, around which, in conformity to a military Law, his own soldiers were singing songs, in which his faults were exposed, to prevent his waxing proud, and forgetting himself ? And when Providence permitted *Paulus Emilius* to triumph over a King of the Macedonians, and his poor children, who stretched out their little hands to the Roman People, to excite compassion, it was so ordered, that the conqueror should, at that very season, suffer the loss of his own

children, that no one man might be allowed to triumph with impunity over the tears of Mankind.

This very People, however, so disposed to pursue their own glory, through the calamities of others, were obliged, in order to dissemble the horror of it, to veil the tears of the Nations with the interest of the Gods, as we disguise with fire the flesh of the animals which is to serve us for food. Rome, following the order of destiny, was to become, at length, the capital of the World. She armed her ambition with a *celestial reason*, in order to render her victorious over powers the most formidable, and to curb by means of it the ferocity of her own citizens, by inuring them to the practice of sublime virtue. What would they have become, had they given themselves up, without restraint to that furious instinct? They would have resembled the savages of America, who burn their enemies alive, and devour their flesh still streaming with blood. This Rome at last experienced, when her Religion presented no longer any thing to her enlightened inhabitants, except unmeaning imagery. Then were seen the two passions natural to the heart of Man, ambition and love, inviting to a residence within her walls, the luxury of Asia, the corruptive arts of Greece, proscriptions, murders, poisonings, conflagrations, and giving her up a prey to barbarous Nations. The Theutates of the Gauls then issuing from the forests of the North, and arriving at the Capitol, made the Roman *Jupiter* to tremble in his turn.

Our *reasons of state* are, in modern times, less sublime, but are not for that less fatal to the repose of Mankind, of which a judgment may be formed by the wars of Europe, which are continually disturbing that of the Globe. A Nation delivered up to its passions, and to simple *reasons of state*, would speedily accumulate upon itself all the miseries incident to humanity; but Providence has implanted in the breast of Man a sentiment which serves as a counterbalance to the weight of these, by directing his desires far beyond the objects of this World; the senti-

ment I mean is that of the existence of the DEITY. Man is not Man, because he is a reasoning animal, but because he is a religious animal.

It is remarked by *Cicero* and *Plutarch*, that there was not a single people known up to their time, among whom there were no traces of religion to be found. The sentiment of DEITY is natural to Man. It is that illumination which *St. John* denominates *the true Light, which lighteth every Man that cometh into the World*. I find great fault with certain modern Authors, and even some of them Missionaries, for having asserted, that certain Nations were destitute of all sense of DEITY. This is, in my apprehension, the blackest of calumnies with which a Nation can be branded, because it, of course, entirely strips them of the existence of every virtue ; and if such a Nation betrays any appearance of virtue, it can be only under the impulse of the most abominable of vices, which is hypocrisy : For there can be no virtue distinct from Religion. But there is not a single one of those inconsiderate writers, who does not, at the same time, himself furnish the means of refuting his own imputation ; for some of them acknowledge, that these very atheistical Nations, on certain days, present homage to the Moon ; or that they retire into the woods, to perform certain ceremonies, the knowledge of which they carefully conceal from strangers.

Father *Gobien*, among others, in his History of the Mariannes Islands, after having affirmed, that their inhabitants had no knowledge of any Deity, and discovered not the slightest idea of Religion, tells us immediately after, that they practise invocation of the dead, to whom they give the appellation of *anitis*, whose skulls they preserve in their houses, and to which they ascribe the power of controlling the elements, of changing the seasons, and of restoring health : That they are persuaded of the immortality of the soul, and acknowledge a Paradise and a Hell.

Such opinions clearly demonstrate that they have ideas of DEITY.

All Nations have the sentiment of the existence of GOD ; not that they all raise themselves to Him, after the manner of a *Newton* and a *Socrates*, in contemplation of the general harmony of his Works, but by dwelling on those of his benefits which interest them the most. The Indian of Peru worships the Sun; he of Bengal, the Ganges, which fertilizes his plains ; the black Iolof, the Ocean which cools his shores : The Samoïède of the North, the reindeer which feeds him. The wandering Iroquois demands of the Spirits, which preside over the lakes and the forests, plentiful fishing and hunting seasons. Many Nations worship their Kings. There is not one of them which, in order to render more dear to men those august dispensers of their felicity, have not called in the intervention of some Divinity for the purpose of consecrating their origin. Such are, in general, the Gods of the Nations : But when the passions interpose, and darken among them this divine instinct, and blend with it either the madness of ambition, or the seduction of voluptuousness, you behold them prostrating themselves before serpents, crocodiles, and other gods, too abominable to be mentioned. You behold them offering in sacrifice, the blood of their enemies and the virginity of their daughters. Such as is the character of a People, such is its religion. Man is carried along by this celestial impulse so irresistibly, that, when he ceases to take the DEITY for his model, he never fails to make one after his own image.

There are, therefore, two powers in Man, the one animal, the other divine. The first is incessantly giving him the sentiment of his wretchedness ; the second, constantly awakening in him that of his own excellence : And from their conflicts are produced the varieties and the contradictions of human life.

By means of the sentiment of our wretchedness it is, that we become alive to every thing which presents to us

the idea of asylum and protection, of ease and accommodation. Hence it is that most men cherish the thought of calm retreats, of abundance, and of all the blessings which bountiful Nature has provided, on the Earth to supply our wants. It is this sentiment which gave to Love the chains of *Hymen*, in order that man might one day find the companion of his pains in that of his pleasures ; and that children might be ensured of the assistance of their parents. It is this which renders the warm and easy tradesman so eager after relations of court intrigues, of battles, and descriptions of tempests, because dangers external and distant increase internal happiness and security. This sentiment frequently mingles with the moral affections : It looks for support in friendship, and for encouragement in commendation. It is this which renders us attentive to the promises of the ambitious man, when we are eager to follow him, like slaves, seduced by the ideas of protection with which he amuses us. Thus the sentiment of our wretchedness is one of the most powerful bonds of political society, though it attaches us to the Earth.

The sentiment of Deity impels us in a contrary direction.* It was this which conducted Love to the altar, and dictated to the lips of the Lover the first vows of fidelity ; it devoted the first children to Heaven, while as yet there was no such thing as political Law ; it render-

* Whenever any one has lost this first of harmonies, all the others follow it. Does it not well deserve to be remarked, that all the Writings of Atheists are insufferably dry and uninteresting ? They sometimes fill you with astonishment, but never do they touch the heart. They exhibit caricatures only, or gigantic ideas. They are totally destitute of order, of proportion, of sensibility. I do not exempt from this censure any one, except the poem of *Lucretius*. But this very exception, as has been said before, only confirms the truth of my observation ; for when this Poet wished to please, he found himself under the necessity of introducing Deity, as is evident from his exordium, which commences with that beautiful apostrophe ; *Alma Venus, &c.* Every where else, when he sets about a display of the Philosophy of *Epicurus*, his insipidity becomes absolutely insupportable.

ed Love sublime, and Friendship generous ; with one hand it succoured the miserable, and opposed the other to tyrants ; it became the moving principle of generosity, and of every virtue. Satisfied with the consciousness of having deserved well of Mankind, it nobly disdained the recompense of applause. When it shewed itself in arts and sciences, it became the ineffable charm which transported us in contemplating them : The moment it withdrew from them, languor succeeded. It is this sentiment which confers immortality on the men of genius who discover to us, in Nature, new relations of intelligence.

When these two sentiments happen to cross each other, that is, when we attach the divine instinct to perishable objects, and the animal instinct to things divine, our life becomes agitated by contradictory passions. This is the cause of those innumerable frivolous hopes and fears with which men are tormented. My fortune is made, says one, I have enough to last me *forever* ; and tomorrow he drops into the grave. How wretched am I ! says another, I am undone *forever* ; and death is at the door to deliver him from all his woes. We are bound down to life, said *Michael Montaigne*, by the merest toys ; by a glass : Yes, and, Wherefore ? Because the sentiment of immortality is impressed on that glass. If life and death frequently appear insupportable to men, it is because they associate the sentiment of their end with that of death, and the sentiment of infinity with that of life. Mortals, if you wish to live happy, and to die in composure, do not let your Laws offer violence to those of Nature. Consider, that, at death, all the troubles of the animal come to a period ; the cravings of the body, diseases, persecutions, calumnies, slavery of every kind, the rude combats of a man's passions with himself, and with others. Consider, that, at death, all the enjoyments of a moral being commence ; the rewards of virtue, and of the slightest acts of justice and of humanity, undervalued, perhaps, or despised by the World, but

which have, in some measure, brought us nearer, while we were upon the Earth, to a Being righteous and eternal.

When these two instincts unite, in the same place, they confer upon us the highest pleasure of which our nature is susceptible; for, in that case, our two natures, if I may thus express myself, enjoy at once.* I am going to trace a slight sketch of the combination of their harmonies; after which we shall pursue the track of the celestial sentiment which is natural to us, as manifested in our most ordinary sensations.

Let me suppose you then, Reader, disgusted, and wearied out with the disorders of Society, in search of some happy spot toward the extremity of Africa, on which the foot of an European never alighted. Sailing along the Mediterranean, your vessel is tossed by the violence of the tempest, and shipwrecked upon a rock, just as it is beginning to grow dark. Through the favour of Heaven you scramble safe to land: You flee for shelter to a grotto, rendered visible by the glare of the lightning, at the bottom of a little valley. There, retired to the covert of this asylum, you hear, all night long, the thunder roaring and the rain descending in torrents. At day break, you discover behind you an amphitheatre of enormous rocks, perpendicularly steep as a wall. From their bases, here and there, start out clumps of fig trees, covered over with white and purple fruit, and tufts of carobs loaded with brown pods; their summits are crowned with pines, wild olive trees and cypresses bending under the violence of the winds. The echoes of these rocks repeat, in the air, the confused howling of the tempest, and the hoarse noise

* To these two instincts may be referred all the sensations of life, which frequently seem to be contradictory. For example, if habit and novelty be agreeable to us, it is that habit gives us confidence respecting our physical relations, which are always the same; and novelty promises new points of view to our divine instinct, which is ever aiming at the extension of its enjoyments.

of the raging Sea, perceptible to the eye at a distance. But the little valley where you are, is the abode of tranquillity and repose. In its mossy declivities the sea lark builds her nest, and on these solitary strands the mavis expects the ceasing of the storm.

By this time the first fires of *Aurora* are lengthening over the flowery stachys, and the violet beds of thyme which clothe the swelling hillocks. The brightening rays disclose to view, on the summit of an adjoining eminence, a cottage overshadowed with trees. Out of it issue a shepherd, his wife and his daughter, who take the path that leads to the grotto, with vases and baskets on their heads. It is the spectacle of your distress which attracts these good people toward you. They are provided with fire, fruits, bread, wine, clothing, for your relief. They vie with each other in rendering you the offices of hospitality. The wants of the body being satisfied, those of the mind begin to call for gratification. Your eye eagerly wanders along the surface of the deep, and you are enquiring within yourself, "On what part of the World am I " thrown?" The shepherd perceives your anxiety, and removes it, addressing you in these words: "That distant " island which you see to the North, is Mycone. There " is Delos, a little to the left, and Paros directly in front. " That in which we are is Naxos; you are on that very " part of the island where *Ariadne* was formerly abandon- " ed by *Theseus*. It was on that long bank of white sand, " which projects below into the Sea, that she passed the " days, with her eyes riveted on that point of the Hori- " zon where the vessel of her faithless lover at length " ceased to be visible; and into this very grotto, where " you now are, she retired, at night, to mourn over his " departure. To the right, between these two little hills, " on the top of which you behold some confused ruins, " stood a flourishing city, named Naxos. Its female in- " habitants, touched with the misfortunes of the daughter " of *Minos*, resorted hither, to look for her, and to com-

fort her. They endeavoured, at first, to divert her attention by amusing conversation; but nothing could give her pleasure, but the name, and the recollection, of her beloved *Theseus*. These damsels then counterfeited letters from that Hero, breathing the tenderest affection, and addressed to *Ariadne*. They flew to deliver them to her, and said, Take comfort, beautiful *Ariadne*. *Theseus* will soon return: *Theseus* thinks of nothing but you. *Ariadne*, in an extacy of delight, read the letters, and, with a trembling hand, hastened to answer them. The Naxian girls took charge of her answers, and promised to have them speedily conveyed to *Theseus*. In this manner they amused her grief. But when they perceived that the sight of the Sea plunged her more and more into melancholy, they decoyed her into those extensive groves which you observe below in the plain. There they invented every species of festivity, that could lull her fond regret to rest. Sometimes they formed around her choral dances, and represented, by the linking of their hands, the various windings of the labyrinth of Crete, out of which, by her aid, escaped the happy *Theseus*: Sometimes they affected to put to death the terrible *Minotaur*. The heart of *Ariadne* expanded to the perception of joy, at the sight of representations which called to her remembrance the power of her father, the glory of her lover and the triumph of her own charms, which had repaired the destiny of Athens: But when the winds conveyed to her ear, through the music of the tabor and of the flute, the distant noise of the billows breaking on the shore from which she saw the cruel *Theseus* take his departure, she turned her face toward the Sea, and began to weep. Thus the Naxians were made sensible, that unfortunate love can find, in the very lap of gaiety, the means of embittering its anguish; and that the recollection of pain is to be lost, only by losing that of pleasure. They endeavoured, therefore, to remove *Ariadne* from scenes

“ and sounds which were continually recalling the idea
“ of her lover. They persuaded her to visit their city,
“ where they provided for her magnificent banquets, in
“ superb apartments, raised on columns of granite. Into
“ these, no male was permitted to enter, and no noise
“ from without could make itself heard. They had taken
“ care to cover the pavement, the walls, the doors and
“ the windows, with the richest tapestry, on which were
“ represented meadows, vineyards and enchanting soli-
“ tudes. A thousand lamps and torches dazzled the eye.
“ They made *Ariadne* seat herself in the midst of them on
“ cushions; they placed a coronet of ivy, with its black
“ clusters, upon her flaxen hair and around her pale fore-
“ head; then they arranged, at her feet, urns of alabaster
“ replenished with the choicest wines; they poured them
“ out into cups of gold, which they presented to her, say-
“ ing; Drink, lovely daughter of *Minos*; this island pro-
“ duces the richest presents of *Bacchus*. Drink, wine
“ dissipates care. *Ariadne*, with a smile, suffered herself
“ to be persuaded. In a little time, the roses of health
“ reappeared on her countenance, and a report was im-
“ mediately spread over *Naxos*, that *Bacchus* was come
“ to the relief of the mistress of *Theseus*. The inhabi-
“ tants, transported with joy, reared a temple to that God,
“ of which you still see some columns and the frontif-
“ piece, on that rock, in the midst of the waves. But
“ wine only added fuel to the love of *Ariadne*. She grad-
“ ually pined away, a victim to her sad regrets, and even
“ to her fond hopes. See there, at the extremity of this
“ valley, on a little hillock, covered with marine worm-
“ wood, is her tomb, and her statue still looking toward
“ the Sea. You can scarcely now distinguish in it the
“ figure of a female; but there is even now discernible in
“ it the restless attitude of a lover. This monument, as
“ well as every other of the country, has been mutilated
“ by time, and still more by the hand of barbarians; but

“ the memory of suffering virtue is not, on the Earth, at
“ the mercy of tyrants. The tomb of *Ariadne* is in possession of the
“ Turks, and her crown is planted among
“ the stars. As for us, escaped from the notice of the
“ powers of this World, by means of our very obscurity,
“ we have, through the goodness of Heaven, found liberty at a distance from the Great, and happiness in a desert. Stranger, if you are still capable of being affected
“ by the blessings of Nature, it is in your power to share
“ them with us.”

At this recital, the gentle tears of humanity trickle down the cheeks of his spouse, and of his youthful daughter, as she breathes a sigh to the memory of *Ariadne*; and I greatly doubt, whether an Atheist himself, who acknowledges nothing else in Nature but the Laws of matter and of motion, could be insensible to those present correspondencies, and those ancient recollections.

Voluptuous men ! Greece alone, you tell me, presents scenes and points of view so tenderly affecting. *Ariadne*, accordingly, has a place in every garden ; *Ariadne* presents herself to view in every collection of painting. From the turret of your own castle, throw your eye over the plains below. As the prospect gradually extends, it terminates in a Horizon much more beautiful than those of desolated Greece. Your apartment is more commodious than a grotto, and your sofas much softer than the turf. The undulation, and the murmuring sound of your flowery meadows are more grateful to the sense than those of the billows of the Mediterranean. Your money and your own gardens can supply you with greater variety of the choicest wines and fruits than all the islands of the Archipelago could produce. Would you blend with these delights that of Deity ? Behold on yonder hill, that small parish church, encircled by aged elms. Among the young women who there assemble, under its rustic portico, there may be, undoubtedly, some forlorn *Ariadne*, betrayed by

a faithless lover.* She is not made of marble, but of living flesh and blood; she is not a Greek, but a French woman; she is not comforted, but insulted by her companions. Visit her humble abode, and soothe her anguish. Do good in this life, which is passing away with the rapidity of a torrent. Do good, not out of ostentation, and by the hands of a stranger; but for the sake of Heaven, and with your own hand. The fruit of virtue loses its flavour, when gathered by another, and not yourself. Ah! if you would, in person, speak an encouraging word to her, under that load of depression; if, by your sympathy, you raise her in her own esteem, you will perceive how, under a sense of your goodness, her forehead is overspread with a blush, her eyes suffused with tears, her convulsive lips move without speaking, and her heart, long oppressed with shame, expand to the approach of a comforter, as to the sentiment of the DEITY. You will then perceive, in the human figure, touches far beyond the reach of the chisels of Greece, and the pencil of a *Van Dyk*. The felicity of an unfortunate young woman will

* There are, in our own plains, young females much more respectable than *Ariadne*, to whom our Historians, who make such a parade of virtue, pay no manner of attention. A person of my acquaintance observed one Sunday, at the gate of a country church, a young woman at prayer, quite alone, while they were chanting vespers within. As he remained some time in the place, he observed, for several Sundays successively, that same young woman, who never once entered the church during the service. Being mightily struck with this singularity of behaviour, he enquired into the meaning of it of some others of the female peasants, who answered him, that it must be her own will merely that determined her to stop at the porch, as they knew of nothing that should prevent her going in, adding, that they had frequently urged her to accompany them, but in vain. At last, desirous of having the solution of this mystery, he addressed himself to the young woman herself, whose conduct appeared to him so very extraordinary. She appeared, at first, somewhat disconcerted, but presently collecting courage, "Sir," said she, "I had a lover who took advantage of
" my frailty. I became pregnant, and my lover falling sick, died, without making me his wife. It is my desire, that a voluntary exclusion
" from church for life should serve as some atonement for my fault, and
" as a warning to my companions."

cost you much less than the statue of *Ariadne*: And instead of giving celebrity to the name of an artist in your hotel, for a few years, this will immortalize your own, and cause it to last, long after you are gone from hence, every time she says to her companions and to her children: "It was a God, who came to succour me in the "day of my distress."

We now proceed to trace the instinct of Divinity in our physical sensations, and shall conclude this Study, by the sentiments of the soul which are purely intellectual. Thus we shall attempt to convey a faint idea of the nature of Man.

OF PHYSICAL SENSATIONS.

All the physical sensations are, in themselves, so many testimonies of our misery. If man is so sensible to the pleasure of the touch, it is because he is naked all his body over. He is under the necessity, in order to clothe himself, of stripping the quadruped, the plant, and the worm. If almost all vegetables and animals are laid under contribution to supply him with food, it is because he is obliged to employ a great deal of cookery, and many combinations, in preparing his aliments. Nature has treated him with much severity; for he is the only one of animals, for the wants of which she has made no immediate provision. Our philosophers have not sufficiently reflected on this perplexing distinction. How! a worm provided with its auger or its file; he enters into life in the midst of a profusion of fruit proper for his subsistence; he, by and by, finds in himself the means of spinning and weaving his own garment; after that, he transforms himself into a gaudy butterfly, who ranges uncontrolled, abandoning himself to all the delights of love,

and reperpetuating his species without anxiety and without remorse ; whereas the son of a King is born completely naked, amidst tears and groans, standing in need, all his life long, of the assistance of another ; under the necessity of maintaining an unremitting conflict with his own species, from within, or from without, and frequently finding in himself his most formidable enemy ! Of a truth, unless we are all the children of dust, it would be a thousand times better to enter upon existence under the form of an insect, than under that of an Emperor. But Man has been abandoned to the most abject misery, only that he may have uninterrupted recourse to the first of powers.

Of the Sense of Tasting.

There is no one physical sensation but what awakens in Man some sentiment of the DEITY.

To begin with the grossest of all our senses, that which relates to eating and drinking ; all Nations, in the savage state, have entertained the belief that the DIVINITY had need to support his life, by the same means that men do ! Hence, in all religions, the origin of sacrifice. Hence, also, has farther proceeded, in many Nations, the custom of placing viands on the tombs of the dead. The wives of the American savages extend this mark of solicitude even to infants who die upon the breast. After having bestowed upon them the rights of sepulture, they come once a day, for several weeks, and press from the nipple a few drops of milk upon the grave of the departed suckling.* This is positively affirmed by the Jesuit *Charlevoix*, who was frequently an eye witness of the fact. Thus

* See Father *Charlevoix's* Travels through America.

the sentiment of DEITY, and that of the immortality of the soul, are interwoven with our affections the most completely animal, and especially with maternal tenderness.

But Man has not satisfied himself with admitting intellectual beings to a share of his repast, and, in some measure, with inviting them to his table; he has found the means of elevating himself to their rank, by the physical effects of those very aliments. It is singularly remarkable, that several Savage Nations have been discovered, who scarcely possessed industry sufficient to procure food for themselves; but not one who had not invented the means of getting drunk. Man is the only animal who is sensible to that pleasure. Other animals are content to remain in their sphere. Man is making perpetual efforts to get out of his. Intoxication elevates the mind. All religious festivals among Savages, and even among polished Nations, end in feasting, in which men drink till reason is gone: They begin, it is true, with fasting, but intoxication closes the scene. Man renounces human reason, that he may excite in himself emotions that are divine. The effect of intoxication is to convey the soul into the bosom of some deity. You always hear topers celebrating, in their songs, *Bacchus*, *Mars*, *Venus*, or the God of Love. It is farther very remarkable, that men do not abandon themselves to blasphemy till they arrive at a state of intoxication; for it is an instinct as usual to the soul, to cleave to the DEITY, when it is in its natural state, as to abjure Him when it is corrupted by vice.

Of the Sense of Smelling.

The pleasures of smell are peculiar to Man; for I do not comprehend under it the olfactory emanations by

which he forms a judgment of his aliments, and which are common to him with most animals. Man alone is sensible to perfumes, and employs them to give more energy to his passions. *Mahomet* said, that they elevated his soul to Heaven. Whatever may be in this, the use of them has been introduced into all the religious ceremonies, and into the political assemblies, of many Nations. The *Brasilians*, as well as all the Savages of North America, never deliberate on any object of importance, without smoking tobacco in a calumet. It is from this practice that the calumet is become, among all those Nations, the symbol of peace, of war, of alliance, according to the accessories with which it is accompanied.

It is undoubtedly, from the same custom of smoking, which was common to the *Scythians*, as *Herodotus* relates, that the caduceus of *Mercury*, which has a striking resemblance to the calumet of the Americans, and which appears, like it, to have been nothing but a pipe, became the symbol of commerce. Tobacco increases, in some measure, the powers of the understanding, by producing a species of intoxication in the nerves of the brain. *Lery* tells us, that the *Brasilians* smoke tobacco till it makes them drunk. It is to be observed, that those nations have found out the most cephalic plant of the whole vegetable kingdom, and that the use of it is the most universally diffused of all those which exist on the Globe, the vine and the corn plants not excepted. I have seen it cultivated in Finland, beyond Viburg, in about the sixty first degree of North Latitude. The habit of using it becomes so powerful, that a person who has acquired it, will rather forego bread, for a day, than his tobacco. This plant is nevertheless a real poison; it affects, at length, the olfactory nerves, and sometimes the sight. But Man is ever disposed to impair his physical constitution, provided he can strengthen in himself the intellectual sentiment.

Of the Sense of Seeing.

Every thing that has been said, in detailing certain general Laws of Nature, harmonies, conformities, contrasts and oppositions, refers principally to the sense of seeing. I do not speak of adaptation, or correspondence ; for this belongs to the sentiment of reason, and is entirely distinct from matter. The other relations are, in truth, founded on the reason itself of Nature, which communicates delight to us by means of colours and forms generative and generated, and inspires melancholy by those which announce decomposition and destruction. But, without entering upon that vast and inexhaustible subject, I shall, at present, confine myself to certain optical effects, which involuntarily excite in us the sentiment of some of the attributes of Deity.

One of the most obvious causes of the pleasure which we derive from the sight of a great tree, arises from the sentiment of infinity kindled in us, by its pyramidical form. The decrease of its different tiers of branches, and tints of verdure, which are always lighter at the extremities of the tree, than in the rest of its foliage, give it an apparent elevation, which never terminates. We experience the same sensations in the horizontal plan of landscapes, in which we frequently perceive several successive hilly elevations flying away one behind another, till the last melt away into the Heavens. Nature produces the same effect in vast plains, by means of the vapours which rise from the banks of the lakes, or from the channels of the brooks and rivers that wander through them ; their contours are multiplied in proportion to the extent of the plain, as I have many a time remarked. Those vapours present themselves on different plans ; sometimes

they stand still, like curtains drawn along the skirts of the forest; sometimes they mount into columns over the brooks which meander through the meadows; sometimes they are quite gray; at other times they are illumined and penetrated by the rays of the Sun. Under all these aspects, they display to us, if I may venture to use the expression, several perspectives of infinity in infinity itself.

I say nothing of the delightful spectacle which the Heavens sometimes present to us, in the disposition of the clouds. I do not know of any Philosopher who has so much as suspected that their beauties were subjected to Law. One thing is certain, namely, that no one animal, which lives in the light, is insensible to their effects. I have spoken, in another place, somewhat of their characters of amability or terror, which are the same with those of amiable or dangerous animals and vegetables, conformably to those of the days and of the seasons which they announce. The Laws of them which I have sketched, will suggest delicious subjects of meditation to any person disposed to study them, excepting those who are determined to apply the mechanical medium of barometers and thermometers. These instruments are good for nothing but the regulation of the atmosphere of our chambers. They too frequently conceal from us the action of Nature; they announce, in most instances, the same temperatures to the days which set the birds a singing, and to those which reduce them to silence. The harmonies of Heaven are to be felt only by the heart of Man. All Nations, struck by their ineffable language, raise their hands and their eyes to Heaven, in the involuntary emotions of joy or of grief.

Reason, however, tells them that GOD is every where. How comes it that no one stretches out his arms toward the Earth, or to the Horizon, in the attitude of invocation? Whence comes the sentiment which whispers to them, *God is in Heaven*? Is it because Heaven is the

place where light dwells? Is it because the light itself, which discloses all objects to us, not being, like our terrestrial substances, liable to be divided, corrupted, destroyed and confined, seems to present something celestial in its substance.

It is to the sentiment of infinity, which the sight of the Heavens inspires, that we must ascribe the taste of all Nations, for building temples on the summit of a mountain, and the invincible propensity which the Jews felt, like other Nations, to worship upon high places. There is not a mountain, all over the islands of the Archipelago, but what has its church; nor a hill, in China, but what has its pagoda. If, as some Philosophers pretend, we never form a judgment of the nature of things, but from the mechanical results of a comparison with ourselves, the elevation of mountains ought to humiliate our insignificance. But the truth is, that these sublime objects, by elevating us toward Heaven, elevate thither the soul of Man, by the sentiment of infinity; and, disjoining us from things terrestrial, waft us to the enjoyment of beauties of much longer duration.

The works of Nature frequently present to us several kinds of infinity at once: Thus, for example, a great tree, the trunk of which is cavernous, and covered with moss, conveys to us the sentiment of infinity as to time, as well as that of infinity in point of elevation. It exhibits a monument of ages when we did not exist. If to this is added infinity of extension, as when we perceive through its solemn branches, objects prodigiously remote, our veneration increases. Go on, and add to all these, the different ridges of its mass, in contrast with the profundity of the valleys, and with the level of the plains; its venerable half lights, which oppose themselves, and play with the azure of the Heavens; and the sentiment of our own wretchedness, which it relieves, by the ideas of the protection which it affords in the thickness of its trunk, immoveable, as the rock and in its august summit, agitated

by the winds, the majestic murmurs of which seem to sympathize with our distresses. A tree, with all these harmonies, seems to inspire an inexpressible religious awe. *Pliny* says, in conformity to this idea, that the trees were the first temples of the Gods.

The sublime impression which they produce, becomes still more profound, when they recal to us some sentiment of virtue, such as the recollection of the great men who planted them, or of those whose tombs they shade. Of this kind were the oaks of Iulus at Troy. It is from an effect of this sentiment, that the mountains of Greece and Italy appear to us more respectable than those of the rest of Europe, though they are of no higher antiquity on the Globe, because their monuments, in ruins as they are, call to our remembrance the virtues of the persons who inhabited them. But this subject belongs not to the present article.

In general, the different sensations of infinity increase by the contrasts of the physical objects which produce them. Our Painters are not sufficiently attentive to the choice of those which they introduce into the fore ground of their pictures. They would give a much more powerful effect to their back ground scenery, if they opposed to it the frontispiece, not only in colours and forms, as they sometime do, but in nature. Thus, for example, if the Artist wished to communicate an affecting interest to a cheerful and smiling landscape, he would do well to present it through a magnificent triumphal arch, crumbling into ruin by length of time. On the contrary, a city filled with Tuscan and Egyptian monuments, would have a still greater air of antiquity, when viewed from under a bower of verdure and flowers. We ought to imitate Nature, who never produces the most lovely plants, in all their beauty, such as mosses, violets and roses, but at the foot of rustic rocks.

Not that consonances do not likewise produce a very powerful effect, especially when they seem to unite ob-

jects which are distinct from each other. It is thus, for instance, that the cupola of the College of the Four Nations, presents a magnificent point of view, when seen from the middle of the court of the Louvre, through the arcade of that palace which is opposite, for then you view it complete, with a portion of the Heaven under the arch, as if it were a part of the Louvre. But in this very consonance, which gives such an extent to our vision, there is likewise a contrast in the concave form of the arcade, with the convex form of the cupola.

The great art of moving is to oppose sensible objects to intellectual. The soul, in that case, takes a daring soar. It passes from the visible to the invisible, and enjoys, if I may be allowed the expression, in its own way, by extending itself into the unbounded fields of sentiment and of intelligence. Among certain Tartar Tribes, when a great man dies, his groom, after the interment, leads out the horse which his master was accustomed to ride, places the clothes which he wore on the horse's back, and walks him, in profound silence, before the assembly, who, by that spectacle, are melted into tears.

When the suppressed circumstances multiply, and unite themselves to some virtuous affection, the emotions of the soul are greatly heightened. Thus when, in the *Æneid*, *Iulus* is promising to make presents to *Nisus* and *Euryalus*, who are going in quest of his father to *Palanteum*, he says to *Nisus* :

* Bina dabo argento perfecta atque aspera signis
Pocula, devictâ genitor quæ cepit Arisbâ ;
Et tripodes geminos, auri duo magna talenta,
Cratera antiquum quem dat Sidonia Dido.

Æneid, Lib. ix. v. 263.

* Two silver cups, emboss'd with nicest art,
I'll give, of warlike spoils my Father's part,
When fam'd Arisba fell ; two tripods old ;
A double talent, too, of purest gold ;
Sidonian Dido's gift shall crown the rest,
A bowl antique, of generous love the test.

“ I will present you with two silver cups of exquisite workmanship, with curious figures in alto relievo. They became my father’s property at the capture of Arisba. To these I will add a pair of twin tripods ; two talents of massy gold ; and an ancient goblet, a token of affection from Queen *Dido*.”

He promises to the two youthful friends, united to each other in the tenderest bonds, double presents, two cups, two tripods to serve as stands for them, after the manner of the ancients, two talents of gold to replenish them with wine, but only one bowl from which they might drink together. And then, what a bowl ! he boasts neither of the materials of which it is composed, nor of the workmanship, as in the case of the other presents ; he connects it with moral qualities infinitely more interesting to the heart of friendship. It is antique ; it was not the prize of violence, but the gift of love. *Iulus*, no doubt, received it as a mark of affection from *Dido*, when she considered herself to be the wife of *Æneas*.

In all the scenes of passion, where the intention is to produce strong emotions, the more that the principal object is circumscribed, the more extended is the intellectual sentiment resulting from it. Several reasons might be assigned for this, the most important of which is, that the accessory contrasts, as those of littleness and greatness, of weakness and strength, of finite and infinite, concur in heightening the contrast of the subject. When *Poussin* conceived the idea of a picture of the universal deluge, he confined it to the representation of a single family. There you see an old man on horseback, on the point of drowning ; and in a boat, a man, who is perhaps his son, presents to his wife, who has made shift to scramble up a rock, a little child dressed in a red petticoat, who, on its part, is making every effort, with its little feet, to get upon the rock. The back ground of the landscape is frightful from its black melancholy. The herbage and the trees are soaked in water, the Earth itself is penetrated by it,

which is rendered visible by that long serpent, in eager haste to quit its hole. The torrents are gushing down on every side ; the Sun appears in the Heavens like an eye thrust out of its socket : But the most powerful interest in the piece bears upon the feeblest object : A father and a mother, ready themselves to perish, are wholly engrossed in the preservation of their infant. Every feeling is extinguished on the Earth, but maternal tenderness is still alive. The human race is destroyed because of its crimes, and innocence is going to be involved in the punishment. These unrestrained torrents, that deluged Earth, that lurid Atmosphere, that extinguished Sun, those desolated solitudes, that fugitive family, all the effects of that universal ruin of the World, are wholly concentrated in an infant. There is no one, however, who, on viewing the small group of personages which surround it, would not exclaim : “ There’s the Universal Deluge !” Such is the nature of the human soul ; so far from being material, it lays hold only of correspondencies. The less you display to it physical objects, the more you awaken in it intellectual feelings.

Of the Sense of Hearing.

Plato calls hearing and seeing the senses of the soul. I suppose he qualifies them particularly by this name, because vision is affected by light, which is not, properly speaking, a substance ; and hearing, by the modulations of the air, which are not of themselves bodies. Besides, these two senses convey to us only the sentiment of correspondencies and harmonies, without involving us in matter, as smelling does, which is affected only by the emanations from bodies, tasting by their fluidity, and touching by their solidity, by their softness, by their heat and

by their other physical qualities. Though hearing and seeing be the direct senses of the soul, we ought not, however, thence to conclude, that a man born deaf and blind must be an idiot, as some have pretended. The soul sees and hears by all the senses. This has been demonstrated in the case of the blind Princes of Persia, whose fingers, according to *Chardin's* report, are so astonishingly intelligent, that they can trace, and calculate, all the figures of Geometry on tablets. Such are, likewise, the deaf and the dumb, whom the *Abbé de l'Épée*, is teaching to converse together.

I have no occasion to be diffuse on the subject of the intellectual relations of hearing. This sense is the immediate organ of intelligence; it is, that which is adapted to the reception of speech, a faculty peculiar to Man, and which, by its infinite modulations, is the expression of all the correspondencies of Nature, and of all the feelings of the human heart. But there is another language, which seems to appertain still more particularly to this first principle of ourselves, to which we have given the name of *sentiment*: I mean music.

I shall not dwell on the incomprehensible power which it possesses of rousing and quieting the passions, in a manner independent of reason, and of kindling sublime affections, disengaged from all intellectual perception: Its effects are sufficiently known. I shall only observe, that it is so natural to Man, that the first prayers addressed to the DEITY, and the original Laws among all Nations, were set to Music. Man loses a taste for it only in polished society, the very languages of which, at length, lose their accentuation. The fact is, that a multitude of social relations destroy, in a state of refinement, the correspondencies of Nature. In that state, we reason much, but scarcely feel any longer.

The AUTHOR of Nature has deemed the harmony of sounds to be so necessary to Man, that there is not a situation upon the Earth but what has its singing bird. The

linnet of the Canaries usually frequents, in those islands, the flinty gutters of the mountains. The goldfinch delights in sandy downs, the lark in the meadows, the nightingale in woods by the side of a brook, the bullfinch, whose note is so sweet, in the white thorn : The thrush, the yellowhammer, the greenfinch, and all other singing birds, have their favourite post. It is very remarkable, that all over the Globe they discover an instinct which attracts them to the habitation of Man. If there be but a single hut in a forest, all the song birds of the vicinity come and settle around it. Nay, none are to be found except in places which are inhabited. I have travelled more than six hundred leagues, through the forests of Russia, but never met with small birds except in the neighbourhood of villages. On making the tour of the fortified places of Russian Finland, with the General Officers of the Corps of Engineers, in which I served, we travelled sometimes at the rate of twenty leagues a day, without seeing on the road either village or bird. But when we perceived the sparrows fluttering about, we concluded that we must be drawing near some inhabited place. In this indication we were never once deceived. I relate it with the more satisfaction, that it may sometimes be of service to persons who have lost their way in the woods.

— *Garcillaſo de la Vega* informs us, that his father having been detached from Peru, with a company of Spaniards, to make discoveries beyond the Cordeliers, was in danger of perishing with hunger in the midst of their uninhabited valleys and quagmires. He never could have got out, had he not perceived in the air a flight of paroquets, which suggested a hope that there might be some place of habitation at no great distance. He directed his march to that point of the compass which the paroquets had pursued, and arrived, after incredible fatigue, at a colony of Indians, who cultivated fields of maize.

It is to be observed, that Nature has not given a musical voice to any one sea or river bird, because it would have

been lost in the noise of the waters, and because the human ear could not have enjoyed it at the distance which they are destined to live from the land. If there are swans which sing, as has been alleged by some, their song must consist of but very few modulations, with some resemblance to the uncouth sounds uttered by the duck and the goose. That of the wild swans, which came lately and settled at Chantilly, has only four or five notes. Aquatic birds have shrill and piercing cries, by means of which they can make themselves heard in the regions of wind and tempest where they inhabit, and are in perfect correspondence with their noisy situations, and their melancholy solitudes.

The melodies of song birds have similar relations to the sites which they occupy, and even to the distances at which they live from our habitations. The lark, who nestles among our corn, and delights in soaring perpendicularly till we lose sight of him, makes his voice to be heard in the air, after he is no longer perceptible to the eye. The swallow, who grazes the walls of our houses as he flies, and reposes on our chimneys, has a small gentle chirping voice, which does not stun the ear, as that of the songsters of the grove would do; but the solitary nightingale makes himself heard at the distance of more than half a league. He mistrusts the vicinity of man; and, nevertheless, always places himself within sight of his habitation, and within the reach of his ear. He chooses, for this effect, places which are the best conductors of sound, in order that their echoing may give more action to his voice. Having stationed himself in his orchestra, he warbles an unknown drama, which has its exordium, its exposition, its recitative, its catastrophe, intermingled sometimes with the most extravagant bursts of joy, sometimes with bitter and plaintive notes of recollection, which he expresses by long and deep sighs. He raises his song at the commencement of that season which renews the face of Nature, and

seems to present Man with a representation of the restless career which lies before him.

Every bird has a voice adapted to the times and the stations of its destination, and relative to the wants of Man. The loud clarion of the cock calls him up to labour at the dawn of day. The brisk and lively song of the lark, in the meadow, invites the swains and shepherdesses to the dance ; the voracious thrush, which appears only in Autumn, summons the rustic vine dresser to the vintage. Man alone, on his part, is attentive to the accents of the feathered race. Never will the deer, who sheds tears copiously over his own misfortunes, sigh over those of the complaining Philomel. Never did the laborious ox, when led to the slaughter, after all his painful services, turn his head toward her, and say : “ Solitary bird, behold in what manner Man rewards his servants ! ”

Nature has diffused these distractions, and these consonances of fortune, over volatile beings, in order that our soul, susceptible as it is of every woe, finding every where occasions of extending that susceptibility, might every where be enabled to alleviate the pressure. She has rendered insensible bodies themselves capable of these communications. She presents to us, frequently, in the midst of scenes which pain the eye, other scenes which delight the ear, and soothe the mind with interesting recollections. It is thus that from the bosom of forests, she transports us to the brink of the waters, by the rustling of the aspens and of the poplars. At other times she conveys to us, when we are by the side of the brook, the noise of the Sea, and the manœuvres of navigation, in the murmuring of reeds shaken by the wind. When she can no longer seduce our reason by foreign imagery, she lulls it to rest by the charm of sentiment : She calls forth from the bosom of the forests, of the meadows, and of the valleys, sounds ineffable, which excite in us pleasing reveries, and plunge us into profound sleep.

Of the Sense of Touching.

I shall make but a few reflections on the sense of touching. It is the most obtuse of all our senses, and, nevertheless, it is, in some sort, the seal of our intelligence. To no purpose is an object exposed to the examination of the eye, in every possible position ; we cannot be persuaded that we know it unless we are permitted to put it to the touch. This instinct proceeds, perhaps, from our weakness, which seeks in these approximations points of protection. Whatever may be in this, the sense in question, blunt as it is, may be made the channel of communicating intelligence, as is evident from the example adduced by *Chardin*, of the blind men of Persia, who traced geometrical figures with their fingers, and formed a very accurate judgment of the goodness of a watch, by handling the parts of the movement.

Wise Nature has placed the principal organs of this sense, which is diffused over the whole surface of our skin, in our hands and feet, which are the members the best adapted to judge of the quality of bodies. But in order that they might not be exposed to the loss of their sensibility, by frequent shocks, she has bestowed on them a great degree of pliancy, by dividing them into several fingers and toes, and these again into several joints ; farther, she has furnished them, on the points of contact, with elastic half pincers, which present, at once, resistance in their callous and prominent parts, and an exquisite sensibility in the retreating parts.

It is matter of astonishment to me, however, that Nature should have diffused the sense of touching over the whole surface of the human body, which becomes thence exposed to variety of suffering, while no considerable ben-

est seems to result from it. Man is the only animal laid under the necessity of clothing himself. There are, indeed, some insects which make cases for themselves, such as the moth ; but they are produced in places where their clothing is, if I may say so, ready made. This necessity, which is become one of the most inexhaustible sources of human vanity, is, in my opinion, one of the most humiliating proofs of our wretchedness. Man is the only being who is ashamed of appearing naked. This is a feeling of which I do not discern the reason in Nature, nor the similitude in the instinct of other animals. Besides, independently of all sense of shame, he is constrained, by powerful necessity, to clothe himself, in every variety of climate.

Certain Philosophers, wrapped up in good warm cloaks, and who never stir beyond the precincts of our great cities, have figured to themselves a natural Man on the Earth, like a statue of bronze in the middle of one of our squares. But to say nothing of the innumerable inconveniencies which must, in such a state, oppress his miserable existence from without, as the cold, the heat, the wind, the rain, I shall insist only on one inconvenience, which is but slightly felt in our commodious apartments, though it would be absolutely insupportable to a naked man, in the most genial of temperatures ; I mean the flies. I shall quote, to this purpose, the testimony of a man whose skin ought to have been proof against this attack : It is that of the free booter *Raveneau de Luffan*, who, in the year 1688, crossed the isthmus of Panama, on his return from the South Seas. Hear what he says, speaking of the Indians of Cape de Gracias a Dios : “ When they are overtaken with an inclination to go to sleep, they dig a hole in the sand, in which they lay themselves along, and then cover themselves all over with the sand which they had dug out ; this they do to shelter themselves from the attack of the musquitos, with which the air is frequently loaded. They are a kind of little flies, that are rather felt than seen, and are armed with a sting so keen, and so venom-

“ous, that when they fix on any one, they seem to dart
“a shaft of fire into the blood.

“The poor wretches are so grievously tormented with
“those formidable insects, when it does not blow, that
“they become like lepers ; and I can affirm it as a seri-
“ous truth, for I know it from my own experience,
“that it is no slight evil to be attacked by them ; for, be-
“sides their preventing all rest in the night time, when
“we were obliged to trudge along, with our backs naked
“for want of shirts, the unceasing persecution of those
“merciless little animals drove us almost to madness and
“despair.”*

It is, I am disposed to believe, on account of the troublesomeness of the flies, which are very common, and very necessary, in the marshy and humid places of hot countries, that Nature has placed but few quadrupeds with hair, on their shores, but quadrupeds with scales, as the tatou, the armadillo, the tortoise, the lizard, the crocodile, the cayman, the land crab, bernard the hermit, and other scaly reptiles, such as serpents, upon which the flies have not the means of fastening. It is, perhaps, for this reason, likewise, that hogs and wild boars, which take pleasure in frequenting such places, are furnished with hair long, stiff and bristly, which keep volatile insects at a distance.

Once more, Nature has not employed, in this respect, any one precaution in behalf of Man. Of a truth, on contemplating the beauty of his forms, and his complete nakedness, it is impossible for me not to admit the ancient tradition of our origin. Nature, in placing him on the Earth, said to him : “Go, degraded creature, animal destitute of clothing, intelligence without light ; go, and
“provide for thy own wants ; it shall not be in thy power
“to enlighten thy blinded reason, but by directing it continually toward Heaven, nor to sustain thy miserable
“life, without the assistance of beings like thyself.” And

* Journal of a Voyage to the South Sea in 1688.

thus, out of the misery of Man, sprung up the two commandments of the Law.

OF THE SENTIMENTS OF THE SOUL.

AND, FIRST,

Of mental Affections.

I shall speak of mental affections, chiefly in the view of distinguishing them from the sentiments of the soul: They differ essentially from each other. For example, the pleasure which comedy bestows is widely different from that of which tragedy is the source. The emotion which excites laughter is an affection of the mind, or of human reason; that which dissolves us into tears is a sentiment of the soul. Not that I would make of the mind, and of the soul, two powers of a different nature; but it seems to me, as has been already said, that the one is to the other, what sight is to the body; mind is a faculty, and soul is the principle of it: The soul is, if I may venture thus to express myself, the body of our intelligence. I consider the mind, then, as an intellectual eye, to which may be referred the other faculties of the understanding, as the *imagination*, which apprehends things future; *memory*, which contemplates things that are past; and *judgment*, which discerns their correspondencies. The impression made upon us by these different acts of vision, sometimes excites in us a sentiment which is denominated *evidence*; and in that case, this last perception belongs immediately to the soul; of this we are made sensible by the delicious emotion which it suddenly excites in us; but, raised to that, it is no longer in the province of mind; because,

when we begin to feel, we cease to reason ; it is no longer vision, it is enjoyment.

As our education and our manners direct us toward our personal interest, hence it comes to pass, that the mind employs itself only about social conformities, and that reason, after all, is nothing more than the interest of our passions ; but the soul, left to itself, is incessantly pursuing the conformities of Nature, and our sentiment is always the interest of Mankind.

Thus, I repeat it, mind is the perception of the Laws of Society, and sentiment is the perception of the Laws of Nature. Those who display to us the conformities of Society, such as comic Writers, Satyrists, Epigrammatists, and even the greatest part of Moralists, are men of wit : Such were the Abbé *de Choisy*, *La Bruyere*, *St. Evremont*, and the like. Those who discover to us the conformities of Nature, such as tragic, and other Poets of sensibility, the Inventors of arts, great Philosophers, are men of genius : Such were *Shakespeare*, *Corneille*, *Racine*, *Newton*, *Marcus Aurelius*, *Montesquieu*, *La Fontaine*, *Fenelon*, *J. J. Rousseau*. The first class belong to one age, to one season, to one nation, to one junto ; the others to posterity and to Mankind.

We shall be still more sensible of the difference which subsists between mind and soul, by tracing their affections in opposite progresses. As often, for example, as the perceptions of the mind are carried up to evidence, they are exalted into a source of exquisite pleasure, independently of every particular relation of interest ; because, as has been said, they awaken a feeling within us. But when we go about to analyze our feelings, and refer them to the examination of the mind, or reasoning power, the sublime emotions which they excited in us vanish away ; for in this case, we do not fail to refer them to some accommodation of society, of fortune, of system, or of some other personal interest, whereof our reason is composed. Thus, in

the first case, we change our copper into gold ; and in the second, our gold into copper.

Again, nothing can be less adapted, at the long run, to the study of Nature, than the reasoning powers of Man; for though they may catch here and there some natural conformities, they never pursue the chain to any great length : Besides, there is a much greater number which the mind does not perceive, because it always brings back every thing to itself, and to the little social or scientific order within which it is circumscribed. Thus, for example, if it takes a glimpse of the celestial spheres, it will refer the formation of them to the labour of a glass house ; and if it admits the existence of a creating Power, it will represent him as a mechanic out of employment, amusing himself with making globes, merely to have the pleasure of seeing them turn round. It will conclude, from its own disorder, that there is no such thing as order in Nature ; from its own immorality, that there is no morality. As it refers every thing to its own reason, and seeing no reason for existence, when it shall be no longer on the Earth, it thence concludes, that, in fact, it shall not in that case exist. To be consistent, it ought equally to conclude, on the same principle, that it does not exist now ; for it certainly can discover, neither in itself, nor in any thing around, an actual reason for its existence.

We are convinced of our existence by a power greatly superior to our mind, which is sentiment, or intellectual feeling. We are going to carry this natural instinct along with us into our researches respecting the existence of the DEITY, and the immortality of the soul ; subjects, on which our versatile reason has so frequently engaged, sometimes on this, sometimes on the other side of the question. Though our insufficiency be too great to admit of launching far into this unbounded career, we presume to hope, that our perceptions, nay, our very mistakes, may encourage men of genius to enter upon it. These sublime and eternal truths seem to us so deeply imprinted on

the human heart, as to appear themselves the principles of our intellectual feeling, and to manifest themselves in our most ordinary affections, as in the wildest excesses of our passions.

OF THE SENTIMENT OF INNOCENCE.

The sentiment of innocence exalts us toward the DEITY, and prompts us to virtuous deeds. The Greeks and Romans employed little children to sing in their religious festivals, and to present their offerings at the altar, in the view of rendering the Gods propitious to their Country, by the spectacle of infant innocence. The sight of infancy calls men back to the sentiments of Nature. When *Cato* of Utica had formed the resolution to put himself to death, his friends and servants concealed his sword; and upon his demanding it, with expressions of violent indignation, they delivered it to him by the hand of a child: But the corruption of the age in which he lived, had stifled in his heart the sentiment which innocence ought to have excited.

JESUS CHRIST recommends to us to become as little children: We call them innocents, *non nocentes*, because they have never injured any one. But, notwithstanding the claims of their tender age, and the authority of the Christian Religion, to what barbarous education are they not abandoned?

Of Pity.

The sentiment of innocence is the native source of compassion; hence we are more deeply affected by the sufferings of a child than by those of an old man. The rea-

son is not, as certain Philosophers pretend, because the resources and hopes of the child are inferior; for they are, in truth, greater than those of the old man, who is frequently infirm, and hastening to dissolution; whereas the child is entering into life; but the child has never offended; he is innocent. This sentiment extends even to animals, which, in many cases, excite our sympathy more than rational creatures do, from this very consideration, that they are harmless. This accounts for the idea of the good *La Fontaine*, in describing the Deluge, in his fable of *Baucis and Philemon*.

.....Tout disparut sur l'heure.
 Les vieillards déploroient ces sévères destins:
 Les animaux perir! Car encor les humains,
 Tous avoient dû tomber sous les célestes armes,
 Baucis en répandit en secret quelques larmes.

All disappear'd in that tremendous hour.
 Age felt the weight of Heaven's insulted power:
 On guilty Man the stroke with justice fell,
 But harmless brutes! — the fierceness who can tell
 Of wrath divine? — At thought of this, some tears
 Stole down the cheeks of *Baucis*.....

Thus the sentiment of innocence developes, in the heart of Man, a divine character, which is that of generosity. It bears, not on the calamity abstractedly considered, but on a moral quality, which it discerns in the unfortunate being who is the object of it. It derives increase from the view of innocence, and sometimes still more from that of repentance. Man alone, of all animals, is susceptible of it: And this, not by a secret retrospect to himself, as some enemies of the Human Race have pretended: For, were that the case, on stating a comparison between a child and an old man, both of them unfortunate, we ought to be more affected by the misery of the old man,

considering that we are removing from the wretchedness of childhood, and drawing nearer to those of old age: The contrary, however, takes place, in virtue of the moral sentiment which I have alleged.

When an old man is virtuous, the moral sentiment of his distress is excited in us with redoubled force; this is an evident proof, that pity in Man is by no means an animal affection. The sight of a *Belisarius* is, accordingly a most affecting object. If you heighten it by the introduction of a child holding out his little hand to receive the alms bestowed on that illustrious blind beggar, the impression of pity is still more powerful. But let me put a sentimental case. Suppose you had fallen in with *Belisarius* soliciting charity, on the one hand, and on the other, an orphan child, blind and wretched, and that you had but one crown, without the possibility of dividing it, to which of the two would you have given it?

If on reflection you find, that the eminent services rendered by *Belisarius* to his ungrateful Country, have inclined the balance of sentiment too decidedly in his favour, suppose the child overwhelmed with the woes of *Belisarius*, and at the same time possessing some of his virtues, such as having his eyes put out by his parents, and, nevertheless, continuing to beg alms for their relief;* there would, in my opinion, be no room for hesitation, provided a man felt only: For if you reason, the case is entirely altered; the talents, the victories, the renown of the Grecian General, would presently absorb the calamities of an obscure child. Reason will recal you to the political interest, to the *I* human.

The sentiment of innocence is a ray of the Divinity. It invests the unfortunate person with a celestial radiance,

* The rector of a country village, in the vicinity of Paris, not far from Dravet, underwent, in his infancy, a piece of inhumanity not less barbarous, from the hands of his parents. He suffered castration from his own father, who was by profession a surgeon: He, nevertheless, supported that unnatural parent in his old age. I believe both father and son are still in life,

which falls on the human heart, and recoils, kindling it into generosity, that other flame of divine original. It alone renders us sensible to the distress of virtue, by representing it to us as incapable of doing harm; for otherwise, we might be induced to consider it as sufficient to itself. In this case it would excite rather admiration than pity.

Of the Love of Country.

This sentiment is, still farther, the source of love of Country, because it brings to our recollection the gentle and pure affections of our earlier years. It increases with extension, and expands with the progress of time, as a sentiment of a celestial and immortal nature. They have, in Switzerland, an ancient musical air, and extremely simple, called the *rans des vaches*. This air produces an effect so powerful, that it was found necessary to prohibit the playing of it, in Holland and in France, before the Swiss soldiers, because it set them all a deserting one after another. I imagine that the *rans des vaches* must imitate the lowing and bleating of the cattle, the repercussion of the echoes, and other local associations, which made the blood boil in the veins of those poor soldiers, by recalling to their memory the valleys, the lakes, the mountains of their Country,* and, at the same time, the

* I have been told that *Poutaveri*, the Indian of Taïti, who was some years ago brought to Paris, on seeing, in the Royal Garden, the paper mulberry tree, the bark of which is, in that island, manufactured into cloth, the tear started to his eye, and clasping it in his arms, he exclaimed: *Ah! tree of my country!* I could wish it were put to the trial, whether, on presenting to a foreign bird, say a paroquet, a fruit of its country, which it had not seen for a considerable time, it would express some extraordinary emotion. Though physical sensations attach us strongly to Country, moral sentiments alone can give them a vehement intensity. Time, which blunts the

companions of their early life, their first loves, the recollection of their indulgent grandfathers, and the like.

The love of Country seems to strengthen in proportion as it is innocent and unhappy. For this reason Savages are fonder of their Country than polished Nations are; and those who inhabit regions rough and wild, such as mountaineers, than those who live in fertile countries and fine climates. Never could the Court of Russia prevail upon a single Samoiède to leave the shores of the Frozen Ocean, and settle at Petersburg. Some Greenlanders were brought, in the course of the last century, to the Court of Copenhagen, where they were entertained with a profusion of kindness, but soon fretted themselves to death. Several of them were drowned, in attempting to return to their Country in an open boat. They beheld all the magnificence of the Court of Denmark with extreme indifference; but there was one, in particular, whom they observed to weep every time he saw a woman with a child in her arms; hence they conjectured that this unfortunate man was a father. The gentleness of domestic education, undoubtedly, thus powerfully attaches those poor people to the place of their birth. It was this which inspired the Greeks and Romans with so much courage in the defence of their Country. The sentiment of innocence strengthens the love of it, because it brings back all the affections of early life, pure, sacred and incorruptible. *Virgil* was well acquainted with the effect of this sentiment, when he put into the mouth of *Nisus*, who was dissuading *Euryalus* from undertaking a nocturnal expedition, fraught with danger, those affecting words :

former, gives only a keener edge to the latter. For this reason it is, that veneration for a monument is always in proportion to its antiquity, or to its distance; this explains that expression of *Tacitus*: *Major è longinquo reverentia*: Distance increases reverence.

Te superesse velim : Tua vitâ dignior ætas.

*If thou survive me, I shall die content :
Thy tender age deserves the longer life.*

But among Nations with whom infancy is rendered miserable, and is corrupted by irksome, ferocious and unnatural education, there is no more love of Country than there is of innocence. This is one of the causes which sends so many Europeans a rambling over the World, and which accounts for our having so few modern monuments in Europe, because the next generation never fails to destroy the monuments of that which preceded it. This is the reason that our books, our fashions, our customs, our ceremonies, and our languages, become obsolete so soon, and are entirely different this age from what they were in the last ; whereas all these particulars continue the same among the sedentary Nations of Asia, for a long series of ages together ; because children brought up in Asia, in the habitation of their parents, and treated with much gentleness, remain attached to the establishments of their ancestors, out of gratitude to their memory, and to the places of their birth, from the recollection of their happiness and innocence.

OF THE SENTIMENT OF ADMIRATION.

The sentiment of admiration transports us immediately into the bosom of DEITY. If it is excited in us by an object which inspires delight, we convey ourselves thither as to the source of joy ; if terror is roused, we flee thither for refuge. In either case, Admiration exclaims in these words, *Ah, my God !* This is, we are told, the effect of

education merely, in the course of which frequent mention is made of the name of GOD; but mention is still more frequently made of our father, of the king, of a protector, of a celebrated literary character. How comes it, then, that when we feel ourselves standing in need of support, in such unexpected concussions, we never exclaim, *Ah, my King!* or, if Science were concerned, *Ah, Newton!*

It is certain, that if the name of GOD be frequently mentioned to us, in the progress of our education, the idea of it is quickly effaced in the usual train of the affairs of this World; Why then have we recourse to it in extraordinary emergencies? This sentiment of Nature is common to all Nations, many of whom give no theological instruction to their children. I have remarked it in the Negroes of the coast of Guinea, of Madagascar, of Caffre, and Mosambique, among the Tartars, and the Indians of the Malabar coast; in a word, among men of every quarter of the World. I never saw a single one who, under the extraordinary emotions of surprise or of admiration, did not make, in his own language, the same exclamation which we do, and who did not lift up his hands and his eyes to Heaven.

Of the Marvellous

The sentiment of admiration is the source of the instinct which men have, in every age, discovered for the marvellous. We are hunting after it continually, and every where, and we diffuse it, principally, over the commencement and the close of human life: Hence it is that the cradles and the tombs of so great a part of Mankind have been enveloped in fiction. It is the perennial source of our curiosity; it discloses itself from early infancy, and is long the companion of innocence. Whence

could children derive the taste for the marvellous? They must have Fairy tales; and men must have epic poems and operas. It is the marvellous which constitutes one of the grand charms of the antique statues of Greece and Rome, representing heroes or gods, and which contributes, more than is generally imagined, to our delight, in the perusal of the ancient History of those Countries. It is one of the natural reasons which may be produced to the President *Henault*, who expresses astonishment that we should be more enamoured of ancient History than of modern, especially that of our own country: The truth is, independently of the patriotic sentiments, which serve, at least, as a pretext to the intrigues of the great men of Greece and Rome, and which were so entirely unknown to ours, that they frequently embroiled their country in maintaining the interests of a particular house, and sometimes in asserting the honour of precedency, or of sitting on a joint stool; there is a marvellous in the religion of the Ancients which consoles and elevates human nature, whereas that of the Gauls terrifies and debases it. The gods of the Greeks and the Romans were patriots, like their great men. *Minerva* had given them the olive, *Nep-tune* the horse. These gods protected the cities and the people. But those of the ancient Gauls were tyrants, like their Barons; they afforded protection only to the Druids. They must be glutted with human sacrifices. In a word, this religion was so inhuman, that two successive Roman Emperors, according to the testimony of *Suetonius* and *Pliny*, commanded it to be abolished. I say nothing of the modern interests of our History; but sure I am that the relations of our politics will never replace in it, to the heart of Man, those of the Divinity.

I must observe that, as admiration is an involuntary movement of the Soul toward Deity, and is, of consequence, sublime, several modern Authors have strained to multiply this kind of beauty in their productions, by an accumulation of surprising incidents; but Nature em-

ploys them sparingly in hers, because Man is incapable of frequently undergoing concussions so violent. She discloses to us, by little and little, the light of the Sun, the expansion of flowers, the formation of fruits. She gradually introduces our enjoyments by a long series of harmonies; she treats us as human beings; that is, as machines feeble and easily deranged; she veils Deity from our view, that we may be able to support his approach.

The Pleasure of Mystery.

This is the reason that mystery possesses so many charms, Pictures placed in the full glare of light, avenues in straight lines, roses fully blown, women in gaudy apparel, are far from being the objects which please us most. But shady valleys, paths winding about through the forests, flowers scarcely half opened, and timid shepherdesses, excite in us the sweetest and the most lasting emotions. The loveliness and respectability of objects are increased by their mysteriousness. Sometimes it is that of antiquity, which renders so many monuments venerable in our eyes; sometimes it is that of distance, which diffuses so many charms over objects in the Horizon; sometimes it is that of names. Hence the Sciences which retain the Greek names, though they frequently denote only the most ordinary things, have a more imposing air of respect than those which have only modern names, though these may, in many cases, be more ingenious and more useful. Hence, for example, the construction of ships, and the art of navigation, are more lightly prized by our modern *literati*, than several other physical sciences of the most frivolous nature, but which are dignified by Greek names. Admiration, accordingly, is not a relation of the understanding, or a perception of our

reason; but a sentiment of the soul, which arises in us, from a certain undescribable instinct of Deity, at sight of extraordinary objects, and from the very mysteriousness in which they are involved. This is so indubitably certain, that admiration is destroyed by the science which enlightens us. If I exhibit to a savage an eolipile darting out a stream of inflamed spirit of wine, I throw him into an ecstasy of admiration; he feels himself disposed to fall down and worship the machine; he venerates me as the God of Fire, as long as he comprehends it not; but no sooner do I explain to him the nature of the process, than his admiration ceases, and he looks upon me as a cheat.*

The Pleasures of Ignorance.

From an effect of those ineffable sentiments, and of those universal instincts of Deity, it is, that ignorance is become the inexhaustible source of delight to Man. We must take care not to confound, as all our Moralists do, ignorance and error. Ignorance is the work of Nature, and, in many cases, a blessing to Man; whereas error is frequently the fruit of our pretended human Sciences, and is always an evil. Let our political Writers say

* For this reason it is that we admire only that which is uncommon. Were there to appear, over the Horizon of Paris, one of those parhelia which are so common at Spitzbergen, the whole inhabitants of the city would be in the streets to gaze at it, and wonder. It is nothing more, however, than a reflection of the Sun's disk in the clouds; and no one stands still to contemplate the Sun himself, because the Sun is an object too well known to be admired.

It is mystery which constitutes one of the charms of Religion. Those who insist upon a geometrical demonstration on this subject, betray a profound ignorance, at once, of the Laws of Nature, and of the demands of the human heart.

what they will, while they boast of our wonderful progress in knowledge, and oppose to it the barbarism of past ages, it was not ignorance which then set all Europe on fire, and inundated it with blood, in settling religious disputations. A race of ignorants would have kept themselves quiet. The mischief was done by persons who were under the power of error, who, at that time, vaunted as much, perhaps, of their superior illumination, as we now a days do of ours, and into each of whom the European spirit of education had instilled this error of early infancy, *Be the first*.

How many evils does ignorance conceal from us, which we are doomed one day to encounter, in the course of human life, beyond the possibility of escaping! the inconstancy of friends, the revolutions of fortune, calumnies, and the hour of death itself, so tremendous to most men. The knowledge of ills like these would mar all the comfort of living. How many blessings does ignorance render sublime! the illusions of friendship, and those of love, the perspectives of hope, and the very treasures which Science unfolds. The Sciences inspire delight only when we enter upon the study of them, at the period when the mind, in a state of ignorance, plunges into the great career. It is the point of contact between light and darkness, which presents to the eye the most favourable state of vision: This is the harmonic point, which excites our admiration, when we are beginning to see clearly; but it lasts only a single instant. It vanishes together with ignorance. The elements of Geometry may have impassioned young minds, but never the aged, unless in the case of certain illustrious Mathematicians, who were proceeding from discovery to discovery. Those sciences only, and those passions, which are subjected to doubt and chance, form enthusiasts at every age of life, such as chemistry, avarice, play and love.

For one pleasure which Science bestows, and causes to perish in the bestowing, ignorance presents us with a

thousand, which flatter us infinitely more. You demonstrate to me that the Sun is a fixed globe, the attraction of which gives to the planets one half of their movements. Had they, who believed it to be conducted round the World by *Apollo*, an idea less sublime? They imagined, at least, that the attention of a God pervaded the Earth, together with the rays of the Orb of Day. It is Science which has dragged down the chaste *Diana* from her nocturnal car: She has banished the Hamadryads from the antique forests, and the gentle Naiads from the fountains. Ignorance had invited the Gods, to partake of its joys and its woes; to Man's wedding, and to his grave: Science discerns nothing in either, except the elements merely. She has abandoned Man to his fellow, and thrown him upon the Earth as into a desert. Ah! whatever may be the names which she gives to the different kingdoms of Nature, celestial spirits, undoubtedly, regulate their combinations so ingenious, so varied and so uniform; and Man, who could bestow nothing upon himself, is not the only being in the Universe who partakes of intelligence.

It is not to the illumination of Science that the DEITY communicates the most profound sentiment of his attributes, but to our ignorance. Night conveys to the mind a much grander idea of infinity than all the glare of day. In the daytime, I see but one Sun; during the night I discern thousands. Are those very stars, so variously coloured, really Suns? Are those planets, which revolve around ours, actually inhabited, as ours is? From whence came the planet Cybele,* discovered but yesterday, by a German of the name of *Herschel*? It has been running its race from the beginning of the Creation, and was, till of late, unknown to us. Whither go those uncertainly revolving comets, traversing the regions of unbounded

* The English, in compliment to their Sovereign, *George III*, give it the name of *Georgium Sidus*.

space? Of what consists that milky way which divides the firmament of Heaven? What are those two dark clouds, placed toward the Antarctic Pole, near the cross of the South? Can there be stars which diffuse darkness, conformably to the belief of the Ancients? Are there places in the firmament which the light never reaches? The Sun discovers to me only a terrestrial infinity, and the night discloses an infinity altogether celestial. O, mysterious ignorance, draw thy hallowed curtains over those enchanting spectacles! Permit not human Science to apply to them its cheerless compasses. Let not virtue be reduced, henceforth, to look for her reward from the justice and the sensibility of a Globe! Permit her to think that there are in the Universe, destinies far different from those which fill up the measure of woe upon this Earth.

Science is continually shewing us the boundary of our reason, and ignorance is for ever removing it. I take care, in my solitary rambles, not to ask information respecting the name and quality of the person who owns the castle which I perceive at a distance. The history of the master frequently disfigures that of the landscape. It is not so with the History of Nature; the more her Works are studied, the more is our admiration excited. There is one case only in which the knowledge of the works of men is agreeable to us, it is when the monument which we contemplate has been the abode of goodness. What little spire is that which I perceive at Montmorency? It is that of Saint Gratian, where *Catinat* lived the life of a sage, and under which his ashes are laid to rest. My soul, circumscribed within the precincts of a small village, takes its flight, and ranges over the capacious sphere of the age of *Louis XIV*, and hastens thence to expatiate through a sphere more sublime than that of the World, the sphere of virtue. When I am incapable of procuring for myself such perspectives as these, ignorance of places answers my purpose much better than the knowl-

edge of them could do. I have no occasion to be informed that such a forest belongs to an Abbey or to a Dutchy, in order to feel how majestic it is. Its ancient trees, its profound glades, its solemn, silent solitudes, are sufficient for me. The moment I cease to behold Man there, that moment I feel a present Deity. Let me give ever so little scope to my sentiment, there is no landscape but what I am able to ennoble. These vast meadows are metamorphosed into Oceans ; these mist clad hills are islands emerging above the Horizon ; that city below, is a city of Greece, dignified by the residence of *Socrates* and of *Xenophon*. Thanks to my ignorance, I can give the reins to the instinct of my soul. I plunge into infinity. I prolong the distance of places by that of ages ; and, to complete the illusion, I make that enchanted spot the habitation of virtue.

OF THE SENTIMENT OF MELANCHOLY.

So beneficent is Nature, that she converts all her phenomena into so many sources of pleasure to Man ; and if we pay attention to her procedure, it will be found, that her most common appearances are the most agreeable.

I enjoy pleasure, for example, when the rain descends in torrents, when I see the old mossy walls dripping, and when I hear the whistling of the wind, mingled with the clattering of the rain. These melancholy sounds, in the night time, throw me into a soft and profound sleep. Neither am I the only person susceptible of such affections. *Pliny* tells us of a Roman Consul, who, when it rained, had his couch spread under the thick foliage of a tree, in order to hear the drops clatter as they fell, and to be lulled to sleep by the murmuring noise.

I cannot tell to what physical Law Philosophers may refer the sensations of melancholy. For my own part, I consider them as the most voluptuous affections of the soul. Melancholy, says *Michael Montaigne*, is dainty. It proceeds, if I am not mistaken, from its gratifying, at once, the two powers of which we are formed, the body and the soul ; the sentiment of our misery, and that of our excellence.

Thus, for example, in bad weather, the sentiment of my human misery is tranquillized, by my seeing it rain, while I am under cover ; by my hearing the wind blow violently, while I am comfortably in bed. I, in this case, enjoy a negative felicity. With this are afterwards blended some of those attributes of the Divinity, the perceptions of which communicate such exquisite pleasure to the soul ; such as infinity of extension, from the distant murmuring of the wind. This sentiment may be heightened from reflection on the Laws of Nature, suggesting to me that this rain, which comes, for the sake of supposition, from the West, has been raised out of the bosom of the Ocean, and, perhaps, from the coasts of America ; that it has been sent to sweep our great cities into cleanliness, to replenish the reservoirs of our fountains ; to render our rivers navigable ; and whilst the clouds, which pour it down, are advancing eastward, to convey fertility even to the vegetables of Tartary, the grains and the garbage, which it carries down our rivers, are hurling away westward, to precipitate themselves into the Sea, to feed the fishes of the Atlantic Ocean. These excursions of my understanding convey to the soul an extension corresponding to its nature, and appear to me so much the more pleasing, that the body, which, for its part loves repose, is more tranquil, and more completely protected.

If I am in a sorrowful mood, and not disposed to send my soul on an excursion so extensive, I still feel much pleasure in giving way to the melancholy which the bad weather inspires. It looks as if Nature was then conform-

ing to my situation, like a sympathizing friend. She is, besides, at all times so interesting, under whatever aspect she exhibits herself, that when it rains, I think I see a beautiful woman in tears. She seems to me more beautiful, the more that she wears the appearance of affliction. In order to be impressed with these sentiments, which I venture to call voluptuous, I must have no project in hand of a pleasant walk, of visiting, of hunting, of journeying, which, in such circumstances, would put me into bad humour, from being contradicted. Much less ought our two component powers to cross, or clash against each other, that is, to let the sentiment of infinity bear upon our misery, by thinking that this rain will never have an end ; and that of our misery to dwell on the phenomena of Nature, by complaining that the seasons are quite deranged, that order no longer reigns in the elements, and thus giving into all the peevish, inconclusive reasonings, adopted by a man who is wet to the skin. In order to the enjoyment of bad weather, our soul must be travelling abroad, and the body at rest.

From the harmony of those two powers of our constitutions it is, that the most terrible revolutions of Nature frequently interest us more than her gayest scenery. The volcano near Naples attracts more travellers to that city, than the delicious gardens which adorn her shores ; the plains of Greece and Italy, overspread with ruins, more than the richly cultivated lawns of England ; the picture of a tempest, more connoisseurs than that of a calm ; and the fall of a tower, more spectators than its construction.

The Pleasure of Ruin.

I was for some time impressed with the belief, that Man had a certain unaccountable taste for destruction. If the populace can lay their hands upon a monument, they are sure to destroy it. I have seen at Dresden, in the gardens of the Count *de Bruhl*, beautiful statues of females, which the Prussian soldiery had amused themselves with mutilating by musket shot, when they got possession of that city. Most of the common people have a turn for slander; they take pleasure in levelling the reputation of all that is exalted. But this malevolent instinct is not the production of Nature. It is infused by the misery of the individuals, whom education inspires with an ambition which is interdicted by Society, and which throws them into a negative ambition. Incapable of raising any thing, they are impelled to lay every thing low. The taste for ruin, in this case, is not natural, and is simply the exercise of the power of the miserable. Man, in a savage state, destroys the monuments only of his enemies; he preserves, with the most assiduous care, those of his own Nation; and, what proves him to be naturally much better than Man in a state of Society, he never slanders his compatriots.

Be it as it may, the passive taste for ruin is universal. Our voluptuaries embellish their gardens with artificial ruins; savages take delight in a melancholy repose by the brink of the Sea, especially during a storm, or in the vicinity of a cascade surrounded by rocks. Magnificent destruction presents new picturesque effects; and it was the curiosity of seeing this produced, combined with cruelty, which impelled *Nero* to set Rome on fire, that he might enjoy the spectacle of a vast conflagration. The sentiment of humanity out of the question, those long

streams of Flame which, in the middle of the night, lick the Heavens, to make use of *Virgil's* expression, those torrents of red and black smoke, those clouds of sparks of all colours, those scarlet reverberations in the streets, on the summit of towers, along the surface of the waters, and on the distant mountains, give us pleasure even in pictures and in descriptions.

This kind of affection, which is by no means connected with our physical wants, has induced certain Philosophers to allege, that our soul, being in a state of agitation, took pleasure in all extraordinary emotions. This is the reason, say they, that such crowds assemble in the Place de Grève to see the execution of criminals. In spectacles of this sort, there is, in fact, no picturesque effect whatever. But they have advanced their axiom as slightly as so many others, with which their Works abound. First, our soul takes pleasure in rest as much as in commotion. It is a harmony very gentle, and very easily disturbed by violent emotions ; and granting it to be, in its own nature, a movement, I do not see that it ought to take pleasure in those which threaten it with its own destruction. *Lucretius* has, in my opinion, come much nearer to the truth, when he says that tastes of this sort arise from the sentiment of our own security, which is heightened by the sight of danger to which we are not exposed. It is a pleasant thing, says he, to contemplate a storm from the shore. It is, undoubtedly, from this reference to self, that the common people take delight in relating, by the fire side, collected in a family way, during the Winter evenings, frightful stories of ghosts, of men losing themselves by night in the woods, of highway robberies. From the same sentiment, likewise, it is, that the better sort take pleasure in the representation of tragedies, and in reading the description of battles, of shipwrecks, and of the crash of empire. The security of the snug tradesman is increased by the danger to which the soldier, the mariner, the courtier is exposed. Pleasure of this kind arises from

the sentiment of our misery, which is, as has been said, one of the instincts of our melancholy.

But there is in us, besides, a sentiment more sublime, which derives pleasure from ruin, independently of all picturesque effect, and of every idea of personal security; it is that of Deity, which ever blends itself with our melancholy affections, and which constitutes their principal charm. I shall attempt to unfold some of the characters of it, by following the impressions made upon us by ruins of different kinds. The subject is both rich and new; but I possess neither leisure nor ability to bestow, upon it, a profound investigation. I shall however drop a few words upon it, by the way, in the view of exculpating and exalting human nature with what ability I have.

The heart of man is so naturally disposed to benevolence, that the spectacle of a ruin, which brings to our recollection only the misery of our fellow men, inspires us with horror, whatever may be the picturesque effect which it presents. I happened to be at Dresden, in the year 1765, which was several years after it had been bombarded. That small, but very beautiful and commercial city, more than half composed of little palaces, charmingly arranged, the fronts of which were adorned externally with paintings, colonades, balconies, and pieces of sculpture, then presented a pile of ruins. A considerable part of the enemy's bombs had been directed against the Lutheran church, called St. Peter's, built in form of a rotundo, and arched over with so much solidity, that a great number of those bombs struck the cupola, without being able to injure it, but rebounded on the adjoining palaces, which they set on fire, and partly consumed. Matters were still in the same state as at the conclusion of the war, at the time of my arrival. They had only piled up, along some of the streets, the stones which encumbered them; so that they formed, on each side, long parapets of blackened stone. You might see halves of palaces standing, laid open from the roof down to the cellars. It was

easy to distinguish in them the extremity of stair cases, painted cielings, little closets lined with Chinese papers, fragments of mirror glasses, of marble chimnies, of smoked gildings. Of others, nothing remained, except massy stacks of chimneys rising amidst the rubbish, like long black and white pyramids. More than a third part of the city was reduced to this deplorable condition. You saw the inhabitants moving backward and forward, with a settled gloom on their faces, formerly so gay, that they were called the Frenchmen of Germany. Those ruins, which exhibited a multitude of accidents singularly remarkable, from their forms, their colours and their grouping, threw the mind into a deep melancholy; for you saw nothing in them but the traces of the wrath of a King, who had not levelled his vengeance against the ponderous ramparts of a warlike city, but against the pleasant dwellings of an industrious people. I observed even more than one Prussian deeply affected at the sight. I by no means felt, though a stranger, that reflection of self security which arises in us on seeing a danger against which we are sheltered; but, on the contrary, a voice of affliction thrilled through my heart, saying to me, *if this were thy Country!*

It is not so with ruins which are the effect of time. These give pleasure by launching us into infinity; they carry us several ages back, and interest us in proportion to their antiquity. This is the reason that the ruins of Italy affect us more than those of our own country; the ruins of Greece more than those of Italy; and the ruins of Egypt more than those of Greece. The first antique monument which I had ever seen was in the vicinity of Orange. It was a triumphal arch, which *Marius* caused to be erected, to commemorate his victory over the *Cimbri*. It stands at a small distance from the city, in the midst of fields. It is an oblong mass, consisting of three arcades, somewhat resembling the gate of St. Denis. On getting near, I became all eyes to gaze at it. What!

exclaimed I, a work of the ancient Romans ! and imagination instantly hurried me away to Rome, and to the age of *Marius*. It would not be easy for me to describe all the successive emotions which were excited in my breast. In the first place, this monument, though erected over the sufferings of Mankind, as all the triumphal arches in Europe are, gave me no pain, for I recollected that the *Cimbri* had come to invade Italy, like bands of Robbers. I remarked, that if this triumphal arch was a memorial of the victories of the Romans over the *Cimbri*, it was likewise a monument of the triumph of time over the Romans. I could distinguish upon it, in the bass relief of the frieze, which represents a battle, an ensign, containing these characters, clearly legible, S. P. Q. R. *Senatus Populus Que Romanus* ; and another inscribed with M. O....the meaning of which I could not make out. As to the warriors, they were so completely effaced, that neither their arms nor their features were distinguishable. Even the limbs of some of them were worn out. The mass of this monument was, in other respects, in excellent preservation, excepting one of the square pillars that supported the arch, which a vicar in the neighbourhood had demolished, to repair his parsonage house. This modern ruin suggested another train of reflection, respecting the exquisite skill of the Ancients, in the construction of their public monuments ; for though the pillar which supported one of the arches, on one side, had been demolished, as I have mentioned, nevertheless, that part of the arch which rested upon it, hung unsupported in the air, as if the pieces of the vaulting had been glued to each other. Another idea likewise struck me, namely, that the demolishing parson might, perhaps, have been a descendant from the ancient *Cimbri*, as we modern French trace up our descent to the ancient Nations of the North, which invaded Italy. Thus, the demolition excepted, of which I by no means approve, from the respect I bear to antiquity, I mused upon the vicissitudes of all human affairs, which

put the victors in the place of the vanquished, and the vanquished in that of the victors. I settled the matter thus, therefore, in my own mind, that as *Marius* had avenged the honour of the Romans, and levelled the glory of the Cimbri, one of the descendants of the Cimbri had, in his turn, levelled that of *Marius*; while the young people of the vicinity, who might come, perhaps, on their days of festivity, to dance under the shade of this triumphal arch, spent not a single thought about either the person who constructed, or the person who demolished it.

The ruins, in which Nature combats with human Art, inspire a gentle melancholy. In these she discovers to us the vanity of our labours, and the perpetuity of her own. As she is always building up, even when she destroys, she calls forth from the clefts of our monuments, the yellow gillyflower, the chænopodium, grasses of various sorts, wild cherry trees, garlands of bramble, stripes of moss and all the saxatile plants, which, by their flowers and their attitudes, form the most agreeable contrasts with the rocks.

I used to stop formerly, with a high degree of pleasure, in the garden of the Luxembourg, at the extremity of the alley of the Carmelites, to contemplate a piece of architecture which stands there, and had been originally intended to form a fountain. On one side of the pediment which crowns it, is stretched along an ancient River god, on whose face time has imprinted wrinkles inexpressibly more venerable than those which have been traced by the chisel of the Sculptor: It has made one of the thighs to drop off, and has planted a maple tree in its place. Of the Naiad who was opposite, on the other side of the pediment, nought remains except the lower part of the body. The head, the shoulders, the arms, have all disappeared. The hands are still supporting an urn, out of which issue, instead of fluviatic plants, some of those which thrive in the driest situations, tufts of yellow gillyflowers, dandelions and long sheaves of saxatile grasses.

A fine style of Architecture always produces beautiful ruins. The plans of Art, in this case, form an alliance with the majesty of those of Nature. I know no object which presents a more imposing aspect than the antique and well constructed towers, which our Ancestors reared on the summit of mountains, to discover their enemies from afar, and out of the coping of which now shoot out tall trees, with their tops waving majestically in the wind. I have seen others, the parapets and battlements of which, inurderous in former times, were embellished with the lilach in flower, whose shades, of a bright and tender violet hue, formed enchanting oppositions with the cavernous and embrowned stone work of the tower.

The interest of a ruin is greatly heightened, when some moral sentiment is blended with it; for example, when those degraded towers are considered as having been formerly the residence of rapine. Such has been, in the *Païs de Caux*, an ancient fortification, called the castle of *Lillebonne*. The lofty walls, which form its precinct, are ruinous at the angles, and so overgrown with ivy, that there are very few spots where the layers of the stones are perceptible. From the middle of the courts, into which I believe it must have been no easy matter to penetrate, arise lofty towers with battlements, out of the summit of which spring up great trees, appearing in the air like a head dress of thick and bushy locks. You perceive here and there, through the mantling of the ivy which clothes the sides of the castle, Gothic windows, embrasures and breaches which give a glimpse of stair cases, and resemble the entrance into a cavern. No bird is seen flying around this habitation of desolation, except the buzzard hovering over it in silence; and if the voice of any of the feathered race makes itself sometimes heard there, it is that of some solitary owl which has retired hither to build her nest. This castle is situated on a rising ground, in the middle of a narrow valley, formed by mountains crowned with forests. When I recollect, at sight of this mansion, that it

was formerly the residence of petty tyrants, who, before the royal authority was sufficiently established over the kingdom, from thence exercised their self created right of pillage, over their miserable vassals, and even over inoffensive passengers who fell into their hands, I imagine to myself that I am contemplating the carcase, or the skeleton, of some huge, ferocious beast of prey.

The Pleasure of Tombs.

But there are no monuments more interesting than the tombs of men, and especially those of our own ancestors. It is remarkable, that every Nation, in a state of Nature, and even the greatest part of those which are civilized, have made the tombs of their forefathers, the centre of their devotions, and an essential part of their religion. From these, however, must be excepted the people whose fathers rendered themselves odious to their children by a gloomy and severe education, I mean, the western and southern Nations of Europe. This religious melancholy is diffused every where else. The tombs of progenitors are, all over China, among the principal embellishments of the suburbs of their cities, and of the hills in the country. They form the most powerful bonds of patriotic affection among savage Nations. When the Europeans have sometimes proposed to these a change of territory, this was their reply: "Shall we say to the bones of our Fathers, arise, and accompany us to a foreign land?" They always considered this objection as insurmountable.

Tombs have furnished, to the poetical talents of *Young* and *Gesner*, imagery the most enchanting. Our voluptuaries, who sometimes recur to the sentiments of Nature, have factitious monuments erected in their gardens. These are not, it must be confessed, the tombs of their parents.

But whence could they have derived this sentiment of funeral melancholy, in the very midst of pleasure? Must it not have been from the persuasion that something still subsists after we are gone? Did a tomb suggest to their imagination only the idea of what it is designed to contain, that is, a corpse merely, the sight of it would shock rather than please them. How afraid are most of them at the thought of death! To this physical idea, then, some moral sentiment must undoubtedly be united. The voluptuous melancholy resulting from it arises, like every other attractive sensation, from the harmony of the two opposite principles; from the sentiment of our fleeting existence, and of that of our immortality; which unite on beholding the last habitation of Mankind. A tomb is a monument erected on the confines of the two Worlds.

It first presents to us the end of the vain disquietudes of life, and the image of everlasting repose: It afterwards awakens in us the confused sentiment of a blessed immortality, the probabilities of which grow stronger and stronger, in proportion as the person whose memory is recalled was a virtuous character. It is there that our veneration fixes. And this is so unquestionably true, that though there be no difference between the dust of *Nero* and that of *Socrates*, no one would grant a place in his grove to the remains of the Roman Emperor, were they deposited even in a silver urn; whereas every one would exhibit those of the Philosopher in the most honourable place of his best apartment, were they contained in only a vase of clay.

It is from this intellectual instinct, therefore, in favour of virtue, that the tombs of great men inspire us with a veneration so affecting. From the same sentiment too it is, that those which contain objects that have been lovely excite so much pleasing regret; for, as we shall make appear presently, the attractions of love arise entirely out of the appearances of virtue. Hence it is that we are moved at the sight of the little hillock which covers the ashes of

an amiable infant, from the recollection of its innocence ; hence, again, it is, that we are melted into tenderness on contemplating the tomb in which is laid to repose a young female, the delight and the hope of her family, by reason of her virtues. In order to render such monuments interesting and respectable, there is no need of bronzes, marbles and gildings. The more simple that they are, the more energy they communicate to the sentiment of melancholy. They produce a more powerful effect, when poor rather than rich, antique rather than modern, with details of misfortune rather than with titles of honour, with the attributes of virtue rather than with those of power. It is in the country, principally, that their impression makes itself felt in a very lively manner. A simple, unornamented grave there, causes more tears to flow than the gaudy splendor of a cathedral interment.* There it is that grief assumes sublimity ; it ascends with the aged yews in the churchyard ; it extends with the surrounding hills and plains ; it allies itself with all the ef-

* Our Artists set statues of marble a weeping round the tombs of the Great. It is very proper to make statues weep, where men shed no tears. I have been many a time present at the funeral obsequies of the rich ; but rarely have I seen any one shedding a tear on such occasions, unless it were, now and then, an aged domestic, who was, perhaps, left destitute. Some time ago, happening to pass through a little frequented street of the Faubourg Saint Marceau, I perceived a coffin at the door of a house of but mean appearance. Close by the coffin was a woman on her knees, in earnest prayer to God, and who had all the appearance of being absorbed in grief. This poor woman having caught with her eye, at the farther end of the street, the priests and their attendants coming to carry off the body, got upon her feet, and run off, putting her hands upon her eyes, and crying bitterly. The neighbours endeavoured to stop her, and to administer some consolation : but all to no purpose. As she passed close by me, I took the liberty to ask if it was the loss of a mother or of a daughter that she lamented so piteously. " Alas ! Sir," said she to me, the tears gushing down her cheeks, " I am mourning the loss of a good lady, who procured me the means of earning my poor livelihood ; she kept me employed from day to day." I informed myself in the neighbourhood respecting the condition of this beneficent lady : She was the wife of a petty joiner. Ye people of wealth, What use then do you make of riches, during your lifetime, seeing no tears are shed over your grave !

fects of Nature, with the dawning of the morning, the murmuring of the winds, the setting of the Sun, and the darkness of the night.

Labour the most oppressive, and humiliation the most degrading, are incapable of extinguishing the impression of this sentiment in the breasts of even the most miserable of Mankind. "During the space of two years," says Father *du Tertre*, "our negro *Dominick*, after the death
" of his wife, never failed, for a single day, as soon as he
" returned from the place of his employment, to take
" the little boy and girl which he had by her, and to conduct them to the grave of the deceased, over which he
" sobbed and wept before them, for more than half an
" hour together, while the poor children frequently
" caught the infection of his sorrow.*" What a funeral oration for a wife and a mother! This man, however, was nothing but a wretched slave.

There farther results, from the view of ruins, another sentiment, independent of all reflection: It is that of heroism. Great Generals have oftener than once employed their sublime effect, in order to exalt the courage of their soldiers. *Alexander* persuaded his army, loaded with the spoils of Persia, to burn their baggage; and the moment that the fire was applied, they are on tiptoe to follow him all over the World. *William*, Duke of Normandy, as soon as he had landed his troops on England, set fire to his own ships, and the conquest of the kingdom was effected.

But there are no ruins which excite in us sentiments so sublime, as the ruins of Nature produce. They represent to us this vast prison of the Earth, in which we are immured, subject itself to destruction; and they detach us, at once, from our passions and prejudices, as from a momentary and frivolous, theatrical exhibition. When Lisbon was destroyed by an earthquake, its inhabitants,

* History of the Antilles: Tr. viii. chap. 1. sect. 4.

on making their escape from their houses, embraced each other; high and low, friends and enemies, Jews and Inquisitors, known and unknown; every one shared his clothing and provisions with those who had saved nothing. I have seen something similar to this take place on board a ship, on the point of perishing in a storm. The first effect of calamity, says a celebrated Writer, is to strengthen the soul, and the second is, to melt it down. It is because the first emotion in Man, under the pressure of calamity, is to rise up toward the DEITY; and the second, to fall back into physical wants. This last effect is that of reflection; but the moral and sublime sentiment, almost always takes possession of the heart, at sight of a magnificent destruction.

Ruins of Nature.

When the predictions of the approaching dissolution of the World spread over Europe, some ages ago, a very great number of persons divested themselves of their property; and there is no reason to doubt, that the very same thing would happen at this day, should similar opinions be propagated with effect. But such sudden and total ruins are not to be apprehended in the infinitely sage plans of Nature: Under them nothing is destroyed, but what is by them repaired.

The apparent ruins of the Globe, such as the rocks which roughen its surface in so many places, have their utility. Rocks have the appearance of ruins in our eyes, only because they are neither square nor polished, like the stones of our monuments; but their anfractuosities are necessary to the vegetables and animals which are destined to find in them nourishment and shelter. It is only for beings vegetative and sensitive, that Nature has created the fossil kingdom; and as soon as Man has raised useless

masses out of it, to these objects, on the surface of the Earth, she hastens to apply her chisel to them, in order to employ them in the general harmony.

If we attend to the origin and the end of her Works, those of the most renowned Nations will appear perfectly frivolous. It was not necessary that mighty Potentates should rear such enormous masses of stone, in order, one day, to inspire me with respect, from their antiquity. A little flinty pebble, in one of our brooks, is more ancient than the pyramids of Egypt. A multitude of cities have been destroyed since it was created. If I feel myself disposed to blend some moral sentiment with the monuments of Nature, I can say to myself, on seeing a rock : “ It was
 “ on this place, perhaps, that the good *Fenelon* reposed,
 “ while meditating the plan of his divine *Telemachus* ;
 “ perhaps the day will come, when there shall be engrav-
 “ ed on it, that he had produced a revolution in Europe,
 “ by instructing Kings, that their glory consisted in ren-
 “ dering Mankind happy ; and that the happiness of Man-
 “ kind depends on the labours of agriculture : Posterity
 “ will gaze with delight on the very stone on which my
 “ eyes are at this moment fixed.” It is thus that I embrace, at once the past and the future, at sight of an insensible rock, and which, by consecrating it to virtue, by a simple inscription, I render infinitely more venerable, than by decorating it with the five orders of Architecture.

Of the Pleasure of Solitude.

Once more, it is melancholy which renders solitude so attractive. Solitude flatters our animal instinct, by inviting us to a retreat so much more tranquil, as the agitations of our life have been more restless ; and it extends our divine instinct, by opening to us perspectives, in which

natural and moral beauties present themselves with all the attraction of sentiment. From the effect of these contrasts, and of this double harmony, it comes to pass, that there is no solitude more soothing than that which is adjoining to a great city ; and no popular festivity more agreeable than that which is enjoyed in the bosom of a solitude.

OF THE SENTIMENT OF LOVE.

Were love nothing superior to a physical sensation, I would wish for nothing more than to leave two lovers to reason and to act, conformably to the physical laws of the motion of the blood, of the filtration of the chyle, and of the other humours of the body, were it my object to give the grossest libertine a disgust for it. Its principal act itself is accompanied with the sentiment of shame, in the men of all countries. No Nation permits publick prostitution ; and though enlightened Navigators may have advanced, that the inhabitants of Taiti conformed to this infamous practice, observers more attentive have since adduced proof, that, as to the island in question, it was chargeable only on young women in the lowest rank of Society, but that the other classes there preserved the sense of modesty, common to all Mankind.

I am incapable of discovering, in Nature, any direct cause of shame. If it be alleged, that Man is ashamed of the venereal act, because it renders him similar to the animal, the reason will be found insufficient ; for sleep, drinking, and eating, bring him still more frequently to the similitude of the animal, and yet no shame attaches to these. There is, in truth, a cause of shame in the physical act : But whence proceeds that which occasions the moral sentiment of it ? Not only is the act carefully kept out of sight, but even the recollection of it. Woman

considers it as a proof of her weakness : She opposes long resistance to the sollicitations of Man. How comes it that Nature has planted this obstacle in her heart, which, in many cases, actually triumphs over the most powerful of propensities, and the most headstrong of passions ?

Independently of the particular causes of shame, which are unknown to me, I think I discern one in the two powers of which Man is constituted. The sense of love being, if I may so express myself, the centre toward which all the physical sensations converge, as those of perfumes, of music, of agreeable colours, and forms, of the touch, of delicate temperatures and flavours ; there results from these a very powerful opposition to that other intellectual power, from which are derived the sentiments of divinity and immortality. Their contrast is so much the more collusive, that the act of the first is in itself animal and blind, and that the moral sentiment, which usually accompanies love, is more expansive and more sublime. The lover, accordingly, in order to render his mistress propitious, never fails to make this take the lead, and to employ every effort to amalgamate it with the other sensation. Thus, shame arises, in my opinion, from the combat of these two powers ; and this is the reason that children naturally have it not, because the sense of love is not yet unfolded in them ; that young persons have a great deal of it, because those two powers are acting in them with all their energy ; and that most old people have none at all, because they are past the sense of love, from a decay of Nature in them, or have lost its moral sentiment, from the corruption of Society ; or, which is a common case, from the effect of both together, by the concurrence of these two causes.

As Nature has assigned to the province of this passion, which is designed to be the means of perpetuating human life, all the animal sensations, she has likewise united in it all the sentiments of the soul ; so that love presents to two lovers, not only the sentiments which blend with

our wants, and with the instinct of our misery, such as those of protection, of assistance, of confidence, of support, of repose, but all the sublime instincts, besides, which elevate Man above humanity. In this sense it is that *Plato* defined love to be, an interposition of the Gods in behalf of young people.*

* It was by means of the sublime influence of this passion, that the Thebans formed a battalion of heroes, called the sacred band ; they all fell together in the battle of Cheronea. They were found extended on the ground, all in the same straight line, transfixed with ghastly wounds before, and with their faces turned toward the enemy. This spectacle drew tears from the eyes of *Philip* himself, their conqueror. *Lycurgus* had likewise employed the power of love in the education of the Spartans, and rendered it one of the great props of his republic. But, as the animal counterpoise of this celestial sentiment was no longer found in the beloved object, it sometimes threw the Greeks into certain irregularities, which have justly been imputed to them as matter of reproach. Their Legislators considered women as the instruments merely of procreating children ; they did not perceive that, by favouring love between men, they enfeebled that which ought to unite the sexes, and that in attempting to strengthen their political bands, they were bursting asunder those of Nature.

The Republic of *Lycurgus* had, besides, other natural defects ; I mention only one, the slavery of the Helots. These two particulars, however, excepted, I consider him as the most sublime genius that ever existed : And even as to these he stands, in some measure, excuseable, in consideration of the obstacles of every kind which he had to encounter in the establishment of his Laws.

There are, in the harmonies of the different ages of human life, relations so delightful, of the weakness of children to the vigour of their parents ; of the courage and the love between young persons of the two sexes to the virtue and the religion of unimpassioned old people, that I am astonished no attempt has been made to present a picture, at least, of a human society thus in concord with all the wants of life, and with the Laws of Nature. There are, it is true, some sketches of this sort, in the *Telemachus*, among others, in the manners of the inhabitants of Bœtica ; but they are indicated merely. I am persuaded that such a Society, thus cemented in all its parts, would attain the highest degree of social felicity, of which human nature is susceptible in this World, and would be able to bid defiance to all the storms of political agitation. So far from being exposed to the fear of danger, on the part of neighbouring States, it might make an easy conquest of them, without the use of arms, as ancient China did, simply by the spectacle of its felicity, and by the influence of its virtues. I once entertained a design, on the suggestion of *J. J. Rousseau*, of extending this idea, by

Whoever would wish to be acquainted with human nature, has only to study that of love; he would perceive springing out of it, all the sentiments of which I have spoken, and a multitude of others. which I have neither time nor talents to unfold. We shall remark, first, that this natural affection discloses, in every being, its principal character, by giving it all the advantage of a complete extension. Thus, for example, it is in the season when each plant re-perpetuates itself by its flowers and its fruit, that it acquires all its perfection, and the characters which invariably determine it. It is in the season of loves that the birds of song redouble their melody, and that those which excel in the beauty of their colouring, array themselves in their finest plumage, the various shades of which they delight to display, by swelling their throats, by rounding their tail into the form of a wheel, or by extending their wings along the ground. It is then that the lusty bull presents his forehead, and threatens with the horn; that the nimble courser frisks along the plain; that the ferocious animals fill the forests with the dreadful noise of their roaring, and that the tigress, exhaling the odour of carnage, makes the solitudes of Africa to resound with her hideous yells, and appears clothed with every horrid, attractive grace, in the eyes of her tremendous lover.

It is, likewise, in the season of loving, that all the affections, natural to the heart of Man, unfold themselves. Then it is that innocence, candour, sincerity, modesty, generosity, heroism, holy faith, piety, express themselves, with grace ineffable, in the attitude and features of two young lovers. Love assumes, in their souls, all the characters of religion and virtue. They betake themselves to flight, far from the tumultuous assemblies of the city, from the corruptive paths of ambition, in quest of some seques-

composing the History of a Nation of Greece, well known to the Poets, because it lived conformably to Nature, and, for that very reason, almost altogether unknown to our political Writers; but time permitted me only to trace the outline of it, or, at most, to finish the first Book.

tered spot, where, upon the rural altar, they may be at liberty to mingle and exchange the tender vows of everlasting affection. The fountains, the woods, the dawning *Aurora*, the constellations of the night, receive by turns the sacred deposit of the oath of Love. Lost, at times, in a religious intoxication, they consider each other as beings of a superior order. The mistress is a goddess, the lover becomes an idolater. The grass under their feet, the air which they breathe, the shades, under which they repose, all, all appear consecrated in their eyes, from filling the same atmosphere with them. In the widely extended Universe, they behold no other felicity but that of living and dying together, or, rather, they have lost all sight of death. Love transports them into ages of infinite duration, and death seems to them only the transition to eternal union.

But should cruel destiny separate them from each other, neither the prospects of fortune, nor the friendship of companions the most endeared, can afford consolation under the loss. They had reached Heaven, they languish on the earth, they are hurried, in their despair, into the retirement of the cloister, to employ the remaining dregs of life, in redemanding of GOD the felicity of which they enjoyed but one transient glimpse. Nay, many an irksome year after their separation, when the cold hand of age has frozen up the current of sense; after having been distracted by a thousand and a thousand anxieties foreign to the heart, which so many times made them forget that they were human, the bosom still palpitates at sight of the tomb which contains the object once so tenderly beloved. They had parted with it in the World, they hope to see it again in Heaven. Unfortunate *Heloïsa*! What sublime emotions were kindled in thy soul by the ashes of thy *Abelard*?

Such celestial emotions cannot possibly be the effects of a mere animal act. Love is not a slight convulsion, as the divine *Marcus Aurelius* calls it. It is to the charms of virtue, and to the sentiment of her divine attributes,

that love is indebted for all that enthusiastic energy. Vice itself, in order to please, is under the necessity of borrowing its looks and its language. If theatrical female performers captivate so many lovers, the seduction is carried on by means of the illusions of innocence, of benevolence, and of magnanimity, displayed in the characters of the shepherdesses, of the heroines, and of the goddesses, which they are accustomed to represent. Their boasted graces are only the appearances of the virtues which they counterfeit. If sometimes, on the contrary, virtue becomes displeasing, it is because she exhibits herself in the disguise of harshness, caprice, peevishness, or some other repulsive bad quality.

Thus, beauty is the offspring of virtue, and ugliness that of vice; and these characters frequently impress themselves from the earliest infancy by means of education. It will be objected to me, that there are men handsome, yet vicious, and others homely, yet virtuous. *Socrates* and *Alcibiades* have been adduced as noted instances, in ancient times. But these very examples confirm my position. *Socrates* was unhappy and vicious at the time of life when the physiognomy assumes its principal characters, from infancy up to the age of seventeen years. He was born in a poor condition; his father had determined, notwithstanding his declared reluctance, to breed him to the art of sculpture. Nothing less than the authority of an oracle could rescue him from this paternal tyranny. *Socrates* acknowledged, in conformity to the decision of a Physiognomist, that he was addicted to women and wine, the vices into which men are usually thrown by the pressure of calamity: At length, he became reformed, and nothing could be more beautiful than this Philosopher, when he discoursed about the DEITY. As to the happy *Alcibiades*, born in the very lap of fortune, the lessons of *Socrates*, and the love of his parents and fellow citizens, expanded in him, at once, beauty of person and of soul; but having been, at last, betrayed into irregular courses,

through the influence of evil communications, nothing remained but the bare physiognomy of virtue. Whatever seduction may be apparent in their first aspect, the ugliness of vice soon discovers itself on the faces of handsome men degraded into wickedness. You can perceive, even under their smiles, a certain marked trait of falsehood and perfidy. This dissonance is communicated even to the voice. Every thing about them is masked, like their face.

I beg leave, farther, to observe, that all the forms of organized beings express intellectual sentiments, not only to the eyes of Man, who studies Nature, but to those of animals, which are instructed, at once, by their instinct, in such particulars of knowledge, as are, in many respects, so obscure to us. Thus, for example, every species of animal has certain traits, which are expressive of its character. From the sparkling and restless eyes of the tiger, you may discover his ferocity and perfidy. The gluttony of the hog is announced by the vulgarity of his attitude, and the inclination of his head toward the ground. All animals are perfectly well acquainted with those characters, for the Laws of Nature are universal. For instance, though there be in the eyes of a man, unless he is very attentive, an exceedingly slight exterior difference between a fox and a species of dog which resembles him, the hen will never mistake the one for the other. She will take no alarm on the approach of the dog, but will be seized with horror the instant that the fox appears.

It is, still farther, to be remarked, that every animal expresses, in its features, some one ruling passion, such as cruelty, sensuality, cunning, stupidity. But Man alone, unless he has been debased by the vices of Society, bears upon his countenance the impress of a celestial origin. There is no one trait of beauty but what may be referred to some virtue : Such an one belongs to innocence, such another to candour, those to generosity, to modesty, to heroism. It is to their influence that Man is indebted in

every country, for the respect and confidence with which he is honoured by the brute creation, unless they have been forced out of Nature by unrelenting persecution on the part of Man.

Whatever charms may appear in the harmony of the colours and forms of the human figure, there is no visible reason why its physical effect should exert an influence over animals, unless the impress of some moral power were combined with it. The plumpness of form, or the freshness of colouring, ought rather to excite the appetite of ferocious animals, than their respect or their love. Finally, as we are able to distinguish their impassioned character, they, in like manner, can distinguish ours, and are capable of forming a very accurate judgment as to our being cruel or pacific. The game birds, which fly the sanguinary fowler, gather confidently around the harmless shepherd.

It has been affirmed, that beauty is arbitrary in every Nation; but this opinion has been already refuted by an appeal to matter of fact. The mutilations of the Negroes, their incisions into the skin, their flattened noses, their compressed foreheads; the flat, long, round and pointed heads of the savages of North America; the perforated lips of the Brasilians; the large ears of the people of Laos, in Asia, and of some Nations of Guiana, are the effects of superstition, or of a faulty education. The ferocious animals themselves are struck at sight of these deformities. All travellers unanimously concur in their testimony, that when lions or tigers are famished, which rarely happens, and thereby reduced to the necessity of attacking caravans in the night time, they fall first upon the beasts of burden, and next upon the Indians, or the black people. The European figure, with its simplicity, has a much more imposing effect upon them, than when disfigured by African or Asiatic characters.

When it has not been degraded by the vices of Society, its expression is sublime. A Neapolitan, of the name

of *John Baptiste Porta*, took it into his head to trace in it relations to the figures of the beasts. To this effect, he has composed a book, embellished with engravings, representing the human head under the forced resemblance of the head of a dog, of a horse, of a sheep, of a hog and of an ox. His system is somewhat favourable to certain modern opinions, and forms a very tolerable alliance with the hideous changes which the passions produce in the human form. But I should be glad to know after what animal *Pigalle* has copied that charming *Mercury* which I have seen at Berlin; and after the passions of what brutes the Grecian Sculptors produced the *Jupiter* of the Capitol, the *Venus pudica*, and the *Apollo* of the Vatican? In what animals have they studied those divine expressions?

I am thoroughly persuaded, as I have said already, that there is not a single beautiful touch in a figure, but what may be allied to some moral sentiment, relative to virtue and to Deity. The traits of ugliness might be, in like manner, referred to some vicious affection, such as jealousy, avarice, gluttony, or rage. In order to demonstrate to our Philosophers, how far they are wide of the mark, when they attempt to make the passions the only moving principles of human life, I wish they could be presented with the expression of all the passions, collected in one single head; for example, the wanton and obscene leer of a courtesan, with the deceitful and haughty air of an ambitious courtier; and accompanied with an infusion of some touches of hatred and envy, which are negative ambitions. A head which should unite them all would be more horrid than that of *Medusa*; it would be a likeness of *Nero*.

Every passion has an animal character, as *John Baptiste Porta* excellently observed. But every virtue, too, has its animal character; and never is a physiognomy more interesting than when you distinguish in it a celestial affection conflicting with an animal passion. Nay, I do not know whether it be possible to express a virtue otherwise

than by a triumph of this kind. Hence it is that modesty appears so lovely on the face of a young female, because it is the conflict of the most powerful of animal passions with a sublime sentiment. The expression of sensibility, likewise, renders a face extremely interesting, because the soul, in this case, shews itself in a state of suffering, and because the sight of this excites a virtue in ourselves, namely, the sentiment of compassion. If the sensibility of the figure in question is active, that is, if it springs, itself, out of the contemplation of the misery of another, it strikes us still more, because then it becomes the divine expression of generosity.

I have a conviction, that the most celebrated statues and pictures of Antiquity owe much of their high reputation entirely to the expression of this double character, that is, to the harmony arising out of the two opposite sentiments of passion and virtue. This much is certain, that the most justly boasted masterpieces, in sculpture and painting, among the Ancients, all presented this kind of contrast. Of this abundance of examples might be adduced from their statues, as the *Venus pudica*, and the dying Gladiator, who preserves, even when fallen, respect for his own glory, at the moment he is sinking into the arms of death. Such, likewise, was that of *Cupid* hurling the thunder after the infant *Alcibiades*, which *Pliny* ascribes to *Praxiteles*, or to *Scopas*. An amiable child, launching from his little hand the dread thunderbolt of *Jupiter*, must excite, at once, the sentiment of innocence, and that of terror. With the character of the God was blended that of a man equally attractive and formidable.

I believe that the paintings of the Ancients expressed, still better, those harmonies of opposite sentiments. *Pliny*, who has preserved to us the memory of the most noted of them, quotes, among others, a picture by *Athenion* of *Maronea*, which represented the cautious and crafty *Ulysses* detecting *Achilles* under the disguise of a young woman, by presenting an assortment of female trinkets, among

which he had carelessly, and without appearance of art, introduced a sword. The lively emotion with which *Achilles* lays hold of that sword, must have exhibited a charming contrast with the habit, and the composed deportment of his nymph character. There must have resulted another, no less interesting, in the character of *Ulysses*, with his air of reserve, and the expression of his satisfaction, under the restraint of prudence, fearful lest, in discovering *Achilles*, he should at the same time betray himself.

Another piece, still more affecting, from the pencil of *Aristides* of Thebes, represented *Biblis* languishing to death of the love which she bore to her own brother. In it there must have been distinctly represented the sentiment of virtue, repelling the idea of a criminal passion, and that of fraternal friendship, which recalled the heart to love, under the very appearances of virtue. These cruel consonances, despair at the thought of being betrayed by her own heart, the desire of dying, in order to conceal her shame, the desire of life to enjoy the sight of the beloved object, health wasting away under the pressure of conflicts so painful, must have expressed, amidst the languors of death and of life, contrasts the most interesting, on the countenance of that ill fated maid.

In another picture, of the same *Aristides*, was represented to admiration, a mother wounded in the breast, during the siege of a city, giving suck to her infant. She seemed afraid, says *Pliny*, lest it should draw in her blood, together with her milk. *Alexander* prized it so highly, that he had it conveyed to Pella, the place of his birth. What emotions must have been excited, in contemplating a triumph so exalted as that of maternal affection absorbing all sense of personal suffering! *Poussin*, as we have seen, has borrowed from this virtue, the principal expression of his picture of the Deluge.

Rubens has employed it, in a most wonderful manner, in giving expression to the face of his *Mary de Medicis*,

in which you distinguish, at once, the anguish, and the joy of child bearing. He farther heightens the violence of the physical passion, by the careless attitude into which the Queen is thrown, in an easy chair, and by her naked foot, which has shaken off the slipper ; and, on the other hand, conveys the sublimity of the moral sentiment awakened in her, by the high destiny of her infant, who is presented to her by a God, reposed in a cradle of bunches of grapes and ears of corn, symbols of the felicity of his reign.

It is thus that the great Masters, not satisfied with opposing mechanically groups of figures and vacuity, shades and lights, children and old men, feet and hands, pursue with unremitting care, those contrasts of our internal powers which express themselves on "the human face divine," in touches ineffable, and which must constitute the eternal charm of their productions. The Works of *Le Sueur* abound in these contrasts of sentiment, and he places them in such perfect harmony with those of the elementary nature, that the result from them is the sweetest, and the most profound melancholy. But it has been much easier for his pencil to paint, than it is for my pen to describe them.

I shall adduce but one example more to my present purpose, taken from *Poussin*, an Artist most admirable for his skill in graphic composition, but whose colours have suffered considerably from the hand of time. The piece to which I refer is his picture of the rape of the Sabine women. While the Roman soldiery are carrying off by force, in their arms, the terrified young women of the Sabines, there is a Roman officer, who is desirous of getting possession of one extremely beautiful as well as young. She has taken refuge in the arms of her mother. He dares not presume to offer violence to her, but seems to address the mother with all the ardour of love, tempered with respect ; his countenance thus speaks : "She will be happy with me ! Let me be indebted for her to love ;

“ and not to fear ! I am less eager to rob you of a daughter, than to give you a son.” It is thus that, while he conforms himself, in dressing his characters, to the simplicity of the age, which rendered all conditions nearly similar, he has distinguished the officer from the soldier, not by his garb, but by his manners. He has caught, as he usually does, the moral character of his subject, which produces a very different effect from that of mere *costume*.

I should have been extremely happy had we been favoured from the pencil of the same ingenious Artist, with a representation of these same female Sabines, after they had become wives and mothers, rushing in between the two contending armies of the Sabines and Romans, “ Running,” as *Plutarch* tells us, “ some on this side, others “ on that, in tears, shrieking, exclaiming ; thrusting themselves through the clashing of arms, and heaps of the “ dead strewed along the ground, like persons frantic, or “ possessed with a spirit, carrying their sucking infants in “ their arms, with hair dishevelled, appealing now to Romans, now to Sabines, by every tender adjuration that “ can reach the heart of Man.”*

The most powerful effects of love, as has been said, arise out of contradictory feelings, melting into each other, just as those of hatred, frequently, are produced from similar sentiments which happen to clash. Hence it is that no feeling can be more agreeable than to find a friend in a man whom we considered as an enemy ; and no mortification so poignant as meeting an enemy in the man whom we depended upon as a friend. These harmonic effects frequently render a slight and transient kindness more estimable than a continued series of good offices ; and a momentary offence more outrageous than the declared enmity of a whole life time ; because, in the first case, feelings diametrically opposite graciously unite ; and, in the second, congenial feelings violently clash. Hence too

* *Plutarch's Life of Romulus.*

it is, that a single blemish, amidst the valuable qualities of a man of worth, frequently appears more offensive than all the vices of a libertine, who displays only a solitary virtue, because, from the effect of contrast, these two qualities become more prominent, and eclipse the others in the two opposite characters. It proceeds, likewise, from the weakness of the human mind, which, attaching itself always to a single point of the object which it contemplates, fixes on the most prominent quality, in framing its decisions. It is impossible to enumerate the errors into which we are every day falling, for want of studying these elementary principles of Nature. It would be possible, undoubtedly, to extend them much farther ; it is sufficient for my purpose, if I have given a demonstration of their existence, and inspired others with an inclination to apply them properly.

These harmonies acquire greater energy from the adjoining contrasts which detach them, from the consonances which repeat them, and from the other elementary Laws which have been indicated ; but if with these are blended some one of the moral sentiments of which I have been presenting a faint sketch in this case, the effect resulting from the whole is inexpressibly delightful. Thus, for example, a harmony becomes, in some sort, celestial, when it contains a mystery, which always supposes something marvellous and divine. I one day felt a most agreeable effect, as I was looking over a collection of old prints, which represented the history of *Adonis*. *Venus* had stolen the infant *Adonis* from *Diana*, and was educating him with her son *Cupid*. *Diana* was determined to recover him, as being the son of one of her nymphs. *Venus*, then, having, on a certain day, alighted from her chariot, drawn by doves, was walking with the two boys in a valley of *Cythera*. *Diana*, at the head of her armed retinue, places herself in ambush, in a forest through which *Venus* was to pass. *Venus*, as soon as she perceived her adversary approaching, and incapable either to escape, or to prevent

the recapture of *Adonis*, was instantly struck with the thought of clapping wings on his shoulders, and presenting *Cupid* and him together to *Diana*, desired her to take either of the children, which she believed to be her property. Both being equally beautiful, both of the same age, and both furnished with wings, the chaste Goddess of the woods was deterred from choosing either the one or the other, and refrained from taking *Adonis*, for fear of taking *Cupid*.

This fable contains several sentimental beauties. I related it one day to *J. J. Rousseau*, who was highly delighted with it. "Nothing pleases me so much," said he, "as an agreeable image, which conveys a moral sentiment!" We were at that time in the plain of Neuilly, near a park, in which we saw a group of Love and Friendship, under the forms of a young man and young woman, of fifteen or sixteen years of age, embracing each other with mouth to mouth. Having looked at it, he said to me, "Here is an obscene image presented, after a charming idea. Nothing could have been more agreeable, than a representation of the two figures in their natural state: Friendship, as a grown young woman careressing an infant *Cupid*." Being on that interesting subject, I repeated to him the conclusion of that touching fable of *Philomela* and *Progné*.

Le désert est-il fait pour des talens si beaux?
 Venez faire aux cités éclater leurs merveilles :
 Aussi bien, en voyant les bois,
 Sans cesse il vous souvient que Térée autrefois,
 Parmi des demeures pareilles,
 Exerça sa fureur sur vos divins appas. —
 Et c'est le souvenir d'un si cruel outrage,
 Qui fait, reprit sa sœur, que je ne vous suis pas :
 En voyant les hommes, hélas !
 Il m'en souvient bien d'avantage.

Why waste such sweetnesss on the desert air !
 Come, charm the city with thy tuneful note.
 Think too, in solitude, that form so fair
 Felt violation ; flee the horrid thought.

Ah ! sister dear, sad Philomel replies,

'Tis this that makes me shun the haunts of men :

Terſus and Courts the anguiſh'd heart allies,

And haſtes, for ſhelter, to the woods again.

“ What a ſeries of ideas !” cried he, “ how tenderly affecting it is !” His voice was ſtifled, and the tears ruſhed to his eyes. I perceived that he was farther moved by the ſecret correſpondencies between the talents and the deſtiny of that bird, and his own ſituation.

It is obvious, then; in the two allegorical ſubjects of *Diana* and *Adonis*, and of Love and Friendſhip, that there are really within us, two diſtinct powers, the harmonies of which exalt the ſoul, when the phyſical image throws us into a moral ſentiment as in the firſt example ; and abate it, on the contrary, when a moral ſentiment recalls us to a phyſical ſenſation, as in the example of Love and Friendſhip.

The ſuppreſſed circumſtances contribute farther to the moral expreſſions, becauſe they are conformable to the expaſſive nature of the ſoul. They conduct it over a vaſt field of ideas. It is to theſe ſuppreſſions that the fable of the Nightingale is indebted for the powerful effect which it produces. Add to theſe a multitude of other oppoſitions, which I have not leiſure to analyze.

The farther that the phyſical image is removed from us, the greater extenſion is given to the moral ſentiment ; and the more circumscribed the firſt is, the more energetic the ſentiment is rendered. It is this, undoubtedly, which communicates ſo much force to our affections, when we regret the death of a friend. Grief, in this caſe, conveys the ſoul from one World to the other, and from an object full of charms to a tomb. Hence it is, that the following paſſage from *Jeremiah* contains a ſtrain of ſublime melancholy : *Vox in Ramâ audita eſt ; ploratus & ululatus multus : Rachel plorans filios ſuos, & noluit conſolari, quia non ſunt.* “ A voice was heard in Ramah, lamen-

" tation and bitter weeping ; Rachael weeping for her
 " children, refused to be comforted for her children, be-
 " cause they were not."* All the consolations which this
 World can administer, are dashed to pieces against this
 word of maternal anguish, *non sunt*.

The single *jet d'eau* of Saint Cloud pleases me more
 than all its cascades. However, though the physical im-
 age should not escape, and lose itself in infinity, it may
 convey sorrow thither, when it reflects the same sentiment.
 I find, in *Plutarch*, a noble effect of this progressive con-
 sonance. "*Brutus*," says he, " giving all up for lost,
 " and having resolved to withdraw from Italy, passed by
 " land through Lucania and came to Elea, which is situ-
 " ated on the sea side. *Portia* being to return from thence
 " to Rome, endeavoured to conceal the grief which op-
 " pressed her, in the prospect of their approaching separ-
 " ation ; but, with all her resolution and magnanimity,
 " she betrayed the sorrow which was preying on her heart,
 " on seeing a picture which there accidentally caught her
 " eye. The subject of the piece was taken from the *Iliad*,
 " and represented the parting of *Heclor* and *Andromache*,
 " when he was preparing to take the field, and at the in-
 " stant when he was delivering the infant *Astyanax* into
 " the arms of his mother, while her eyes remain immove-
 " ably fixed on *Heclor*. The resemblance which the
 " picture bore to her own distress made her burst into
 " tears ; and several times a day she resorted to the place
 " where it hung, to gaze at it, and to weep before it.
 " This being observed by *Acilius*, one of the friends of
 " *Brutus*, he repeated the passage from *Homer*, in which
 " *Andromache* expresses her inward emotion :

Εκτωρ ἀτὰρ σύ μοι ἑσσι πατήρ καὶ πότνια μήτηρ,
 Ἡ δὲ κασίγνητ'. σύ δὲ μοι θαλερὸν παρὰ κούρης.

* Jeremiah, chap. xxxi. ver. 15.

Yet while my *Heclor* still survives, I see
 My father, mother, kindred, all in thee,
 My wedded Lord.....

“ *Brutus* replied, with a smile, *But I must not answer*
 “ *Portia* in the words of *Heclor* to *Andromache*:

Ἀλλ' εἰς οἶκον ἴδου, τὰ σπυτῆς ἔργα κόμιζε,
 Ἴσον τ' ἡλακκίτην τε, καὶ ἀμφιπέλοισι κέλευε.

.....hasten to thy tasks at home,
 There guide the spindle, and direct the loom.

“ *For though the natural weakness of her body prevents*
 “ *her from acting what the strength of men only can per-*
 “ *form, yet she has a mind as valiant, and as active for the*
 “ *good of her Country as we have.*”

This picture was, undoubtedly, placed under the peristyle of some temple, built on the shore of the Sea. *Brutus* was on the point of embarking without pomp, and without a retinue. His wife, the daughter of *Cato*, had accompanied him, perhaps on foot. The moment of separation approaches; in order to soothe her anguish, she fixes her eyes on that painting, consecrated to the Gods. She beholds in it the last, long farewell of *Heclor* and *Andromache*; she is overwhelmed; and to reanimate her fortitude, turns her eyes upon her husband. The comparison is completed, her courage forsakes her, tears gush out, conjugal affection triumphs over love of Country. Two virtues in opposition! Add to these the characters of a wild nature, which blend so well with human grief: Profound solitude, the columns and the cupola of that antique temple, corroded by the keen air of the Sea, and marbled over with mosses, which give them the appearance of green bronze; a setting Sun, which gilds the summit of it; the hollow murmurs of the Sea, at a distance, breaking

along the coast of Lucania ; the towers of Elea perceptible, in the bosom of a valley, between two steep mountains, and that sorrow of *Portia*, which hurries us back to the age of *Andromache*. What a picture, suggested by the contemplation of a picture ! O, ye Artists, could you but produce it, *Portia* would, in her turn, call forth many a tear.

I could multiply, without end, proofs of the two powers by which we are governed. Enough has been said on the subject of a passion, the instinct of which is so blind, to evince that we are attracted to it, and actuated by it, from Laws widely different from those of digestion. Our affections demonstrate the immortality of the soul, because they expand in all the circumstances, in which they feel the attributes of Deity, such as that of infinity, and never dwell with delight on the Earth, except on the attractions of virtue and innocence.

OF SOME OTHER SENTIMENTS OF DEITY, AND AMONG OTHERS, OF THAT OF VIRTUE.

There are, besides these, a great number of sentimental Laws, which it has not been in my power, at present, to unfold : Such are those which suggest presentiments, omens, dreams, the reference of events, fortunate and unfortunate, to the same epochs and the like. Their effects are attested among Nations, polished and savage, by Writers profane and sacred, and by every man who pays attention to the Laws of Nature. These communications of the soul, with an order of things invisible, are rejected by the learned of modern times, because they come not within the province of their systems and of their almanacks ; but how many things exist, which are not reducible to the

plans of our reason, and which have not been so much as perceived by it!

There are particular laws which demonstrate the immediate action of Providence on the Human Race, and which are opposite to the general Laws of Physics. For example, the principles of reason, of passion and of sentiment, as well as the organs of speech and of hearing, are the same in men of all countries; nevertheless, the language of Nations differs all the world over. How comes it that the art of speech is so various among beings who all have the same wants, and that it should be constantly changing in the transmission from father to son, to such a degree, that we modern French no longer understand the language of the Gauls, and that the day is coming, when our posterity will be unable to comprehend ours? The ox of Bengal bellows like that of the Ukraine, and the nightingale pours out the same melodious strains to this day, in our climates, as those which charmed the ear of the Bard of Mantua, by the banks of the Po.

It is impossible to maintain, though it has been alleged by certain Writers of high reputation, that languages are characterized by climates; for, if they were subjected to influence of this kind, they would never vary in any country, in which the climate is invariable. The language of the Romans was at first barbarous, afterwards majestic, and is become, at last, soft and effeminate. They are not rough to the North, and soft to the South, as *J. J. Rousseau* pretends, who, in treating this point, has given far too great extension to physical Laws. The language of the Russias, in the North of Europe, is very soft, being a dialect of the Greek; and the jargon of the southern provinces of France is harsh and coarse. The Laplanders, who inhabit the shores of the Frozen Ocean, speak a language that is very grateful to the ear; and the Hottentots, who inhabit the very temperate climate of the Cape of Good Hope, cluck like India cocks. The language of the Indians of Peru is loaded with strong aspirations and

consonants of difficult pronunciation. Any one, without going out of his closet, may distinguish the different characters of the language of each Nation, by the names presented on the geographical charts of the Country, and may satisfy himself that their harshness, or softness, has no relation whatever to those of Latitude.

Other observers have asserted, that the languages of Nations have been determined and fixed by their great Writers. But the great Writers of the age of *Augustus* did not secure the Latin language from corruption, previously to the reign of *Marcus Aurelius*. Those of the age of *Louis XIV*, already begin to be antiquated among ourselves. If posterity fixes the character of a language to the age which was productive of great Writers, it is not because, as they allege, it is then at its greatest purity; for you find in them as many of those inversions of phraseology, of those decompositions of words, and of those embarrassed syntaxes, which render the metaphysical study of all Grammar tiresome and barbarous; but it is because the Writings of those great men sparkle with maxims of virtue, and present us with a thousand perspectives of the DEITY. I have no doubt that the sublime sentiments which inspire them, illuminate them still in the order and disposition of their Works, seeing they are the sources of all harmony. From this, if I am not mistaken, results the unalterable charm which renders the perusal of them so delicious, at all times, and to the men of all Nations. Hence it is that *Plutarch* has eclipsed most of the Writers of Greece, though he was of the age neither of *Pericles*, nor of *Alexander*; and that the translation of his Works into old French, by the good *Amyot*, will be more generally read by posterity than most of the original Works produced even in the age of *Louis XIV*. It is the moral goodness of a period which characterizes a language, and which transmits it unaltered to the generation following. This is the reason that the languages, the customs and even the form of dresses are, in Asia, trans-

mitted inviolably from generation to generation, because fathers, all over that Continent, make themselves beloved by their children. But these reasons do not explain the diversity of language which subsists between one Nation and another. It must ever appear to me altogether supernatural, that men who enjoy the same elements, and are subjected to the same wants, should not employ the same words in expressing them. There is but one Sun to illuminate the whole Earth, and he bears a different name in every different land.

I beg leave to suggest a farther effect of a Law to which little attention has been paid ; it is this, that there never arises any one man eminently distinguished, in whatever line, but there appears, at the same time, either in his own Country, or in some neighbouring Nation, an antagonist, possessing talents, and a reputation, in complete opposition : Such were *Democritus* and *Heraclitus*, *Alexander* and *Diogenes*, *Descartes* and *Newton*, *Corneille* and *Racine*, *Bossuet* and *Fenelon*, *Voltaire* and *J. J. Rousseau*. I had collected, on the subject of the two extraordinary men last mentioned, who were contemporaries, and who died the same year, a great number of strictures, which demonstrate that, through the whole course of life, they presented a striking contrast in respect of talents, of manners, and of fortune : But I have relinquished this parallel, in order to devote my attention to a pursuit which I deemed much more useful.

This balancing of illustrious characters will not appear extraordinary, if we consider that it is a consequence from the general Law of contraries, which governs the World, and from which all the harmonies of Nature result : It must, therefore, particularly manifest itself in the Human Race, which is the centre of the whole ; and it actually does discover itself, in the wonderful equilibrium, conformably to which the two sexes are born in equal numbers. It does not fix on individuals, in particular, for we see families consisting wholly of daughters, and others all sons ;

but it embraces the aggregate of a whole city, and of a Nation, the male and female children of which are always produced very nearly equal in number. Whatever inequality of sex there may exist in the variety of births in families, the equality is constantly restored in the aggregate of a people.

But there is another equilibrium no less wonderful, which has not, I believe, become an object of attention. As there are a great many men who perish in War, in sea voyages, and by painful and dangerous employments, it would thence follow, that, at the long run, the number of women would daily go on in an increasing proportion. On the supposition, that there perishes annually one tenth part more of men than of women, the balancing of the sexes must become more and more unequal. Social ruin must increase from the very regularity of the natural order. This, however, does not take place; the two sexes are always, very nearly, equally numerous: Their occupations are different; but their destiny is the same. The women, who frequently impel men to engage in hazardous enterprizes to support their luxury, or who foment animosities, and even kindle wars among them, to gratify their vanity, are carried off, in the security of pleasure and indulgence, by maladies to which men are not subject; but which frequently result from the moral, physical and political pains which the men undergo in consequence of them. Thus the equilibrium of birth between the sexes, is reestablished by the equilibrium of death.

Nature has multiplied those harmonic contrasts in all her Works, relatively to Man; for the fruits which minister to our necessities, frequently possess, in themselves, opposite qualities, which serve as a mutual compensation.

These effects, as has been elsewhere demonstrated, are not the mechanical results of climate, to the qualities of which they are frequently in opposition. All the Works of Nature have the wants of Man for their end; as all the sentiments of Man have Deity for their principle.

The final intentions of Nature have given to Man the knowledge of all her Works, as it is the instinct of Deity which has rendered Man superior to the Laws of Nature. It is this instinct which, differently modified by the passions, engages the inhabitants of Russia to bathe in the ices of the Neva, during the severest cold of Winter, as well as the Nations of Bengal in the waters of the Ganges; which, under the same Latitudes, has rendered women slaves in the Philippine Islands, and despots in the Island of Formosa; which makes men effeminate in the Moluccas, and intrepid in Macassar; and which forms, in the inhabitants of one and the same city, tyrants, citizens and slaves.

The sentiment of Deity is the first mover of the human heart. Examine a man in those unforeseen moments, when the secret plans of attack and defence, with which social man continually encloses himself, are suppressed, not on the sight of a vast ruin, which totally subverts them, but simply on seeing an extraordinary plant or animal: "Ah, my God!" exclaims he, "how wonderful this is!" and he invites the first person who happens to pass by, to partake of his astonishment. His first emotion is a transport of delight which raises him to GOD; and the second, a benevolent disposition to communicate his discovery to men; but the social reason quickly recalls him to personal interest. As soon as he sees a certain number of spectators assembled round the object of his curiosity, "It was I," says he, "who observed it first." Then, if he happens to be a Scholar, he fails not to apply his system to it. By and by he begins to calculate how much this discovery will bring him in; he throws in some additional circumstances, in order to heighten the appearance of the marvellous, and he employs the whole credit of his junto to puff it off, and to persecute every one who presumes to differ from him in opinion. Thus, every natural sentiment elevates us to GOD, till the weight of our passions, and of human institutions, brings us back a-

gain to self. *J. J. Rousseau* was, accordingly, in the right, when he said that Man was good, but that men were wicked.

It was the instinct of Deity which first assembled men together, and which became the basis of the Religion and of the Laws whereby their union was to be cemented. On this it was that virtue found a support, in proposing to herself the imitation of the Divinity, not only by the exercise of the Arts and Sciences, which the ancient Greeks, for this effect, denominated the petty virtues; but in the result of the divine power and intelligence, which is beneficence: It consisted in efforts made upon ourselves, for the good of Mankind, in the view of pleasing GOD only. It gave to Man the sentiment of his own excellence, by inspiring him with the contempt of terrestrial and transient enjoyments, and with a desire after things celestial and immortal. It was this sublime attraction which exalted courage to the rank of a virtue, and which made Man advance intrepidly to meet death, amidst so many anxieties to preserve life. Gallant *d' Affas*, What had you to hope for on the Earth, when you poured out your blood in the night, without a witness, in the plains of Klosterkam, for the salvation of the French army? And you, generous *Eustace de St. Pierre*, what recompense did you expect from your Country, when you appeared before her tyrants, with the halter about your neck, ready to meet an infamous death, in saving your fellow citizens? Of what avail, to your insensible ashes, were the statues and the elogiums which posterity was one day to consecrate to your memory? Could you so much as hope for this reward, in return for sacrifices either unknown, or loaded with opprobriousness? Could you be flattered, in ages to come, with the empty homage of a world separated from you by eternal barriers? And you, more glorious still in the sight of GOD, obscure citizens, who sink ingloriously into the grave; you, whose virtues draw down upon your heads shame, calumny, persecution, poverty, contempt, even on

the part of those who dispense the honours of a present state, could you have forced your way through paths so dreary and so rude, had not a light from Heaven illuminated your eyes ?*

* It is impossible for virtue to subsist independently of Religion. I do not mean the theatrical virtues, which attract publick admiration, and that, many a time, by means so contemptible, that they may be rather considered as so many vices. The very Pagans have turned them into ridicule. See what *Marcus Aurelius* has said on the subject. By virtue I understand the good which we do to men, without expectation of reward on their part, and, frequently, at the expense of fortune, nay, even of reputation. Analyze all those whose traits have appeared to you the most striking; there is no one of them but what points out Deity, nearer or more remote. I shall quote one not generally known, and singularly interesting from its very obscurity.

In the last war in Germany, a Captain of cavalry was ordered out on a foraging party. He put himself at the head of his troop, and marched to the quarter assigned him. It was a solitary valley, in which hardly any thing but woods could be seen. In the midst of it stood a little cottage; on perceiving it, he went up, and knocked at the door; out comes an ancient Hernouten, with a beard silvered by age. "Father," says the officer, "shew me a field where I can set my troopers a foraging."....."Presently," replied the Hernouten. The good old man walked before, and conducted them out of the valley. After a quarter of an hour's march, they found a fine field of barley: "There is the very thing we want," says the Captain....."Have patience for a few minutes," replies his guide, "you shall be satisfied." They went on, and, at the distance of about a quarter of a league farther, they arrived at another field of barley. The troop immediately dismounted, cut down the grain, trussed it up, and remounted. The officer, upon this, says to his conductor, "Father, you have given yourself and us unnecessary trouble; the first field was much better than this"....."Very true, Sir," replied the good old man, "but it was not mine."

This stroke goes directly to the heart. I defy an atheist to produce me any thing once to be compared with it. It may be proper to observe, that the Hernoutens are a species of Quakers, scattered over some cantons of Germany. Certain Theologians have maintained, that heretics were incapable of virtue, and that their good actions were utterly destitute of merit. As I am no Theologian, I shall not engage in this metaphysical discussion, though I might oppose to their opinion the sentiments of *St. Jerome*, and even those of *St. Peter*, with respect to Pagans, when he says to *Cornelius* the centurion. "Of a truth, I perceive that God is no respecter of persons; but in every Nation, he that feareth Him, and worketh righteousness, is ac-

This respect for virtue, is the source of that which we pay to ancient Nobility, and which has introduced, in process of time, unjust and odious differences among men,

“cepted with Him.”* But I should be glad to know what those Theologians think of the charity of the good Samaritan, who was a schismatic. Surely they will not venture to start objections against a decision pronounced by JESUS CHRIST himself. As the simplicity and depth of his divine responses, form an admirable contrast with the dishonesty and subtilty of modern doctors, I shall transcribe the whole passage from the Gospel, word for word.

“And behold, a certain lawyer stood up, and tempted him, saying, Master, What shall I do to inherit eternal life?

“He said unto him, What is written in the law? How readeſt thou?

“And he, answering, said, Thou shalt love the LORD thy GOD with all thy heart, and with all thy soul, and with all thy strength, and with all thy mind; and thy neighbour as thyself.

“And he said unto him, Thou hast answered right: This do and thou shalt live.

“But he, willing to justify himself, said unto JESUS, And, Who is my neighbour?

“And JESUS answering, said, A certain *man* went down from Jerusalem to Jericho, and fell among thieves, which stripped him of his raiment, and wounded *him*, and departed, leaving *him* half dead.

“And by chance there came down a certain priest that way; and when he saw him, he passed by on the other side.

“And likewise a Levite, when he was at the place came and looked on *him*, and passed by on the other side.

“But a certain Samaritan, as he journeyed, came where he was; and when he saw him, he had compassion on *him*.

“And went to him, and bound up his wounds, pouring in oil and wine, and set him on his own beast, and brought him to an inn, and took care of him.

“And on the morrow, when he departed, he took out two pence, and gave *them* to the host, and said unto him, Take care of him; and whatsoever thou spendest more, when I come again, I will repay thee.

“Which now of these three, thinkest thou was neighbour unto him that fell among the thieves?

“And he said, He that shewed mercy on him. Then said JESUS unto him, Go, and do thou likewise.”†

I shall be carefully on my guard against adding any reflections of my own on this subject, except this simple observation, that the action of the

* Acts of the Apostles, chap. x. ver. 34, 35.

† Luke, chap. x. ver. 25—37.

whereas, originally, it was designed to establish among them, respectable distinctions alone. The Asiatics, more equitable, attached nobility only to places rendered illustrious by virtue. An aged tree, a well, a rock, objects of stability, appeared to them as alone adapted to perpetuate the memory of what was worthy of being remembered. There is not, all over Asia, an acre of land, but what is dignified by a monument. The Greeks and Romans who issued out of it, as did all the other Nations of the World, and who did not remove far from it, imitated, in part, the customs of our first Fathers. But the other Nations which scattered themselves over the rest of Europe, where they were long in an erratic state, and who withdrew from those ancient monuments of virtue, chose rather to look for them in the posterity of their great men, and to see the living images of them in their children. This is the reason, in my opinion, that the Asiatics have no Noblesse, and the Europeans no monuments.

This instinct of Deity constitutes the charm of the performances which we peruse with most delight. The Writers to whom we always return with pleasure, are not the most sprightly, that is, those who abound the most in the social reason which endures but for a moment, but those who render the action of Providence continually

Samaritan is far superior to that of the Hernouten ; for, though the second makes a great sacrifice, he is in some sort determined to it by force : A field must of necessity have been subjected to forage. But the Samaritan entirely obeys the impulse of humanity. His action is free, and his charity spontaneous. This stricture, like all those of the Gospel, contains, in a few words, a multitude of clear and forcible instructions, respecting the duties inculcated in the second table of the Law. It would be impossible to replace them by others, were imagination itself permitted to dictate them. Weigh all the circumstances of the restless and persevering charity of the Samaritan. He dresses the wounds of an unfortunate wretch, and places him on his own horse ; he exposes his own life to danger, by stopping, and walking on foot, in a place frequented by thieves. He afterwards makes provision, in the inn, for the future, as well as for the present, necessities of the unhappy man, and continues his journey, without expecting any recompense whatever from the gratitude of the person whom he had succoured,

present to us. Hence it is that *Homer, Virgil, Xenophon, Plutarch, Fenelon*, and most of the ancient Writers, are immortal, and please the men of all Nations. For the same reason it is, that books of travels, though, for the most part, written very artlessly, and though decried by multitudes of various orders in Society, who discern in them an indirect censure of their own conduct, are, nevertheless, the most interesting part of modern reading; not only because they disclose to us some new benefits of Nature, in the fruits and the animals of foreign countries, but because of the dangers by land and by water which their authors have escaped, frequently beyond all reasonable expectation. Finally, it is because the greatest part of our very learned productions studiously steer clear of this natural sentiment, that the perusal of them is so very dry and disgusting, and that posterity will prefer *Herodotus* to *David Hume*, and the Mythology of the Greeks to all our treatises on Physics; because we love still more to hear the fictions of Deity blended with the History of men, than to see the reason of men in the History of Deity.

This sublime sentiment inspires Man with a taste for the marvellous, who, from his natural weakness, must have ever been crawling on the ground, of which he is formed. It balances in him the sentiment of his misery, which attaches him to the pleasures of habit; and it exalts his soul, by infusing into him continually the desire of novelty. It is the harmony of human life, and the source of every thing delicious and enchanting that we meet with in the progress of it. With this it is that the illusions of love ever veil themselves, ever representing the beloved object as something divine. It is this which opens to ambition perspectives without end. A peasant appears desirous of nothing in the World, but to become the church warden of his village. Be not deceived in the man! open to him a career without any impediment in his way; he is groom, he becomes highwayman, captain

of the gang, a commander in chief of armies, a king, and never rests till he is worshipped as a God. He shall be a *Tamerlane* or a *Mahomet*.

An old rich tradesman, nailed to his easy chair by the gout, tells us, that he has no higher ambition than to die in peace. But he sees himself eternally renovating in his posterity. He enjoys a secret delight in beholding them mount, by the dint of his money, along all the ascending steps of dignity and honour. He himself reflects not that the moment approaches when he shall have nothing in common with that posterity, and that while he is congratulating himself on being the source of their future glory, they are already employing the upstart glory which they have acquired, in drawing a veil over the meanness of their original. The atheist himself, with his negative wisdom, is carried along by the same impulse. To no purpose does he demonstrate to himself the nothingness, and the fluctuation of all things : His reason is at variance with his heart. He flatters himself inwardly with the hope, that his book, or his monument, will one day attract the homage of posterity ; or, perhaps, that the book, or the tomb, of his adversary will cease to be honoured. He mistakes the DEITY, merely because he puts himself in his place.

With the sentiment of Deity, every thing is great, noble, beautiful, invincible, in the most contracted sphere of human life ; without it, all is feeble, displeasing, and bitter, in the very lap of greatness. This it was which conferred empire on Rome and Sparta, by shewing to their poor and virtuous inhabitants the Gods as their protectors and fellow citizens. It was the destruction of this sentiment which gave them up, when rich and vicious, to slavery ; when they no longer saw, in the Universe, any other Gods except gold and pleasure. To no purpose does a man make a bulwark around himself of the gifts of fortune ; the moment this sentiment is excluded from his heart, languor takes possession of it. If its absence is prolonged, he sinks

into sadness, afterwards into profound and settled melancholy, and finally into despair. If this state of anxiety becomes permanent, he lays violent hands on himself. Man is the only sensible being which destroys itself in a state of liberty. Human life, with all its pomp, and all its delight, ceases, to him, to have the appearance of life, when it ceases to appear to him immortal and divine.*

Whatever be the disorders of Society, this celestial instinct is ever amusing itself with the children of men. It inspires the man of genius, by disclosing itself to him under eternal attributes. It presents to the Geometrician, the ineffable progressions of infinity; to the Musician, rapturous harmonies; to the Historian, the immortal shades of virtuous men. It raises a Parnassus for the Poet, and an Olympus for the Hero. It sheds a lustre on

* *Plutarch* remarks, that *Alexander* did not abandon himself to those excesses, which sullied the conclusion of his glorious career, till he believed himself to be forsaken of the Gods. Not only does this sentiment become a source of misery, when it separates itself from our pleasures; but when, from the effect of our passions, or of our institutions, which pervert the Laws of Nature, it presses upon our miseries themselves. Thus, for example, when after having given mechanical Laws to the operations of the soul, we come to make the sentiment of infinity to bear upon our physical and transient evils; in this case, by a just reaction, our misery becomes insupportable. I have presented only a faint sketch of the two principles in Man; but to whatever sensation of pain, or of pleasure, they may be applied, the difference of their nature, and their perpetual reaction, will be felt.

On the subject of *Alexander* forsaken of the Gods, it is matter of surprise to me, that the expression of this situation should not have inspired the genius of some Grecian Artist. Here is what I find on this subject in *Addison*: "There is in the same gallery, (at Florence) a fine bust of *Alexander* the Great, with the face turned toward Heaven, and impressed with a certain dignified air of chagrin and dissatisfaction. I have seen two or three ancient busts of *Alexander*, with the same air, and in the same attitude; and I am disposed to believe, that the Sculptor pursued the idea of the Conqueror sighing after new worlds, or some similar circumstance of his History." (*Addison's Voyage to Italy*.) I imagine that the circumstance of *Alexander's* History, to which those busts ought to be referred, is that which represents him complaining of being abandoned of the Gods. I have no doubt that it would have fixed the exquisite judgment of *Addison*, had he recollected the observation made by *Plutarch*.

the unfortunate days of the labouring poor. Amidst the luxury of Paris, it extracts a sigh from the breast of the humble native of Savoy, after the sacred covering of the snows upon his mountains. It expatiates along the vast Ocean, and recalls, from the gentle climates of India, the European mariner, to the stormy shores of the West. It bestows a country on the wretched, and fills with regret those who have lost nothing. It covers our cradles with the charms of innocence, and the tombs of our forefathers with the hopes of immortality. It reposes in the midst of tumultuous cities, on the palaces of mighty Kings, and on the august temples of Religion. It frequently fixes its residence in the desert, and attracts the attention of the Universe to a rock. Thus it is that you are clothed with majesty, venerable ruins of Greece and Rome; and you, too, mysterious pyramids of Egypt! This is the object which we are invariably pursuing, amidst all our restless occupations; but the moment it discovers itself to us, in some unexpected act of virtue, or in some one of those events which may be denominated strokes of Heaven, or in some of those indescribably sublime emotions, which are called sentimental touches, by way of excellence, its first effect is to kindle in the breast a very ardent movement of joy, and the second is to melt us into tears. The soul, struck with this divine light, exults, at once, in enjoying a glimpse of the heavenly Country, and sinks at the thought of being exiled from it.

.....Oculis errantibus alto

Quæsitivæ cælo lucem, ingemuitque repertâ.

ÆNEID, BOOK IV.

With wandering eyes explor'd the heavenly light,
Then sigh'd, and sunk into the shades of night.

THE END.











